VOL. XLII. No. 1 JANUARY 1957

MECCANO MAGAZINE

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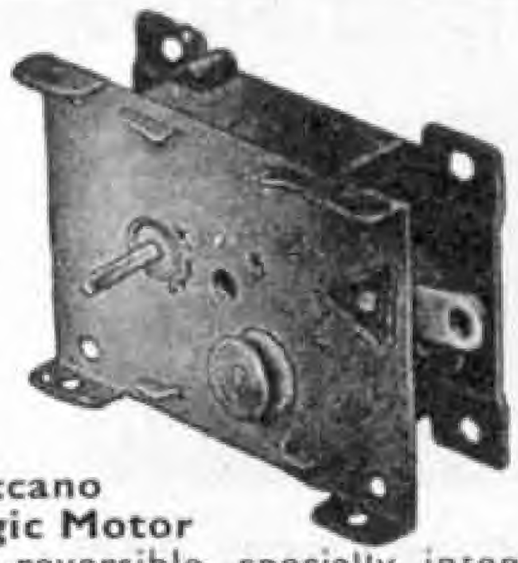
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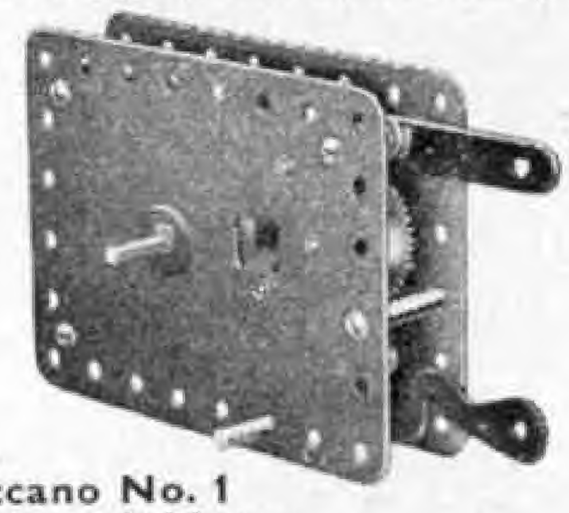
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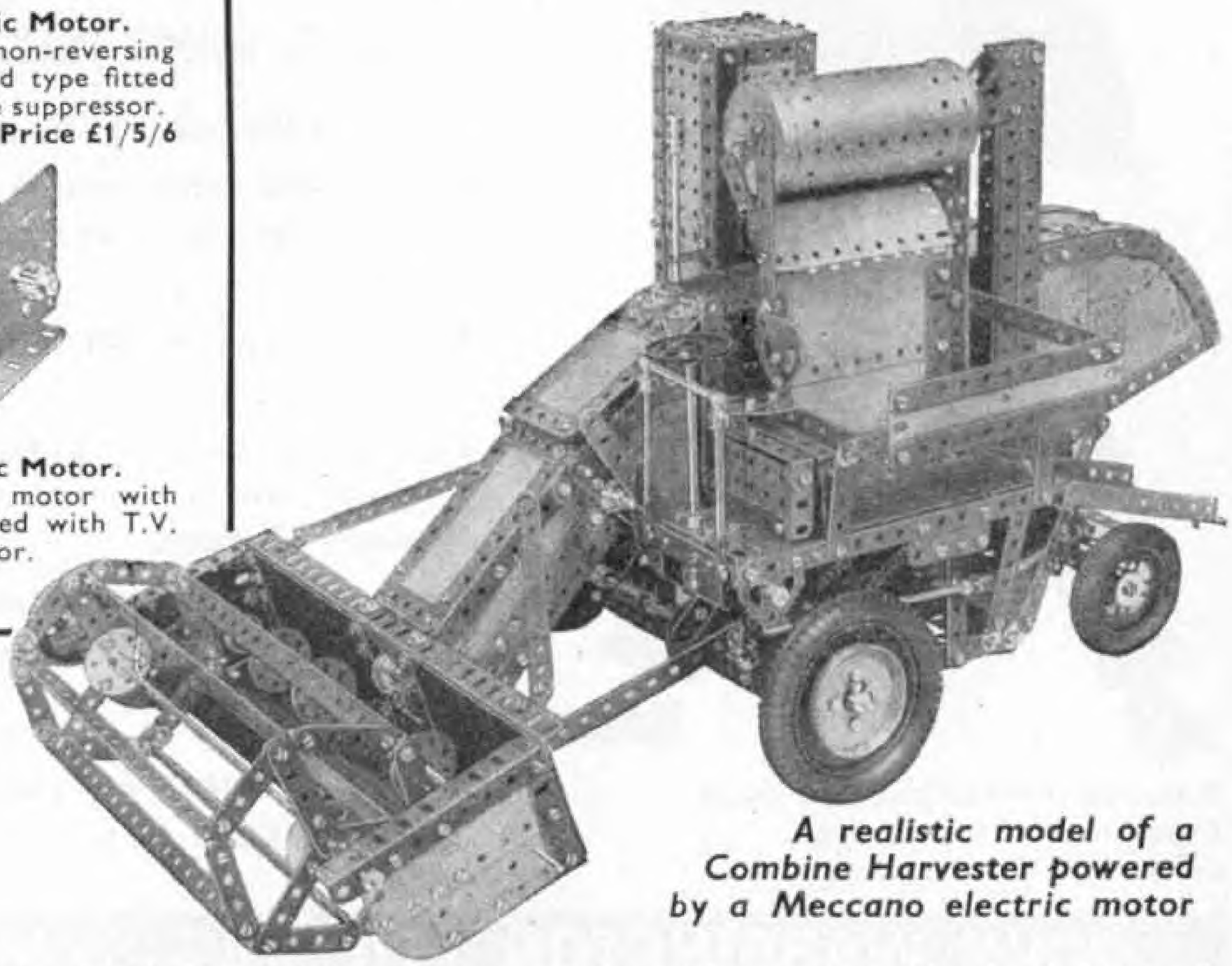
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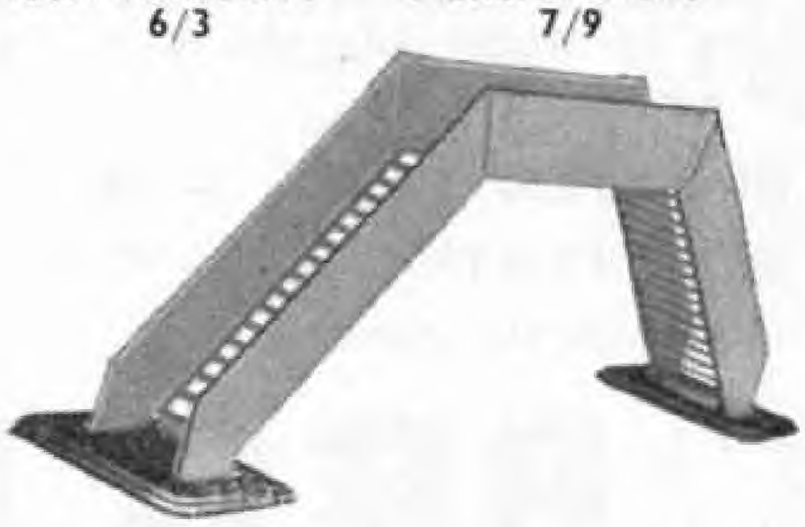
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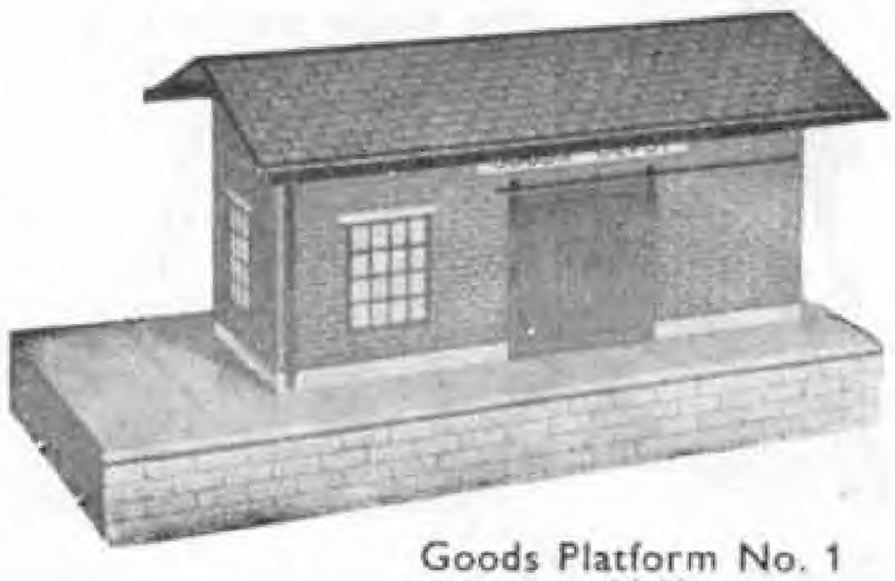
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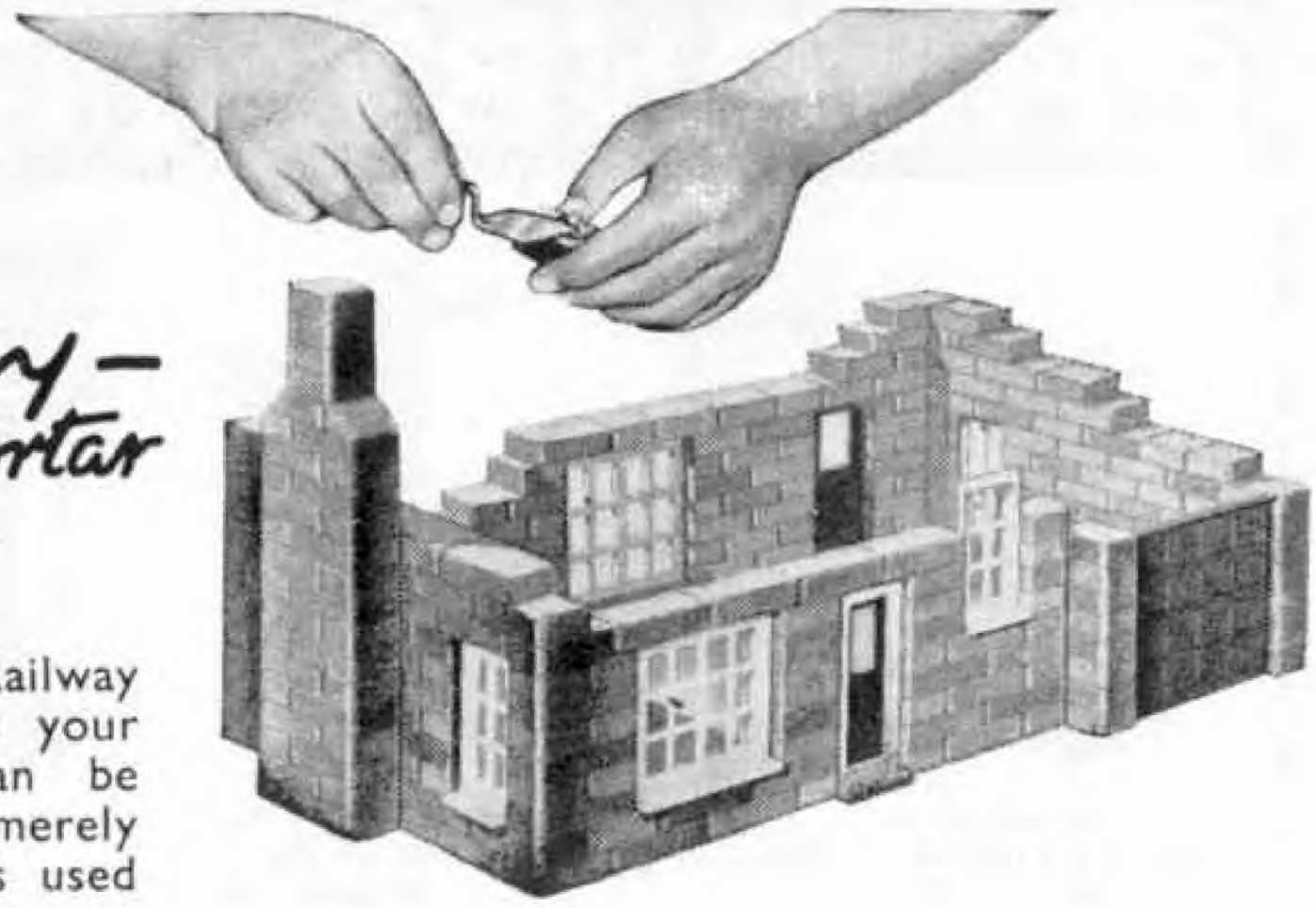
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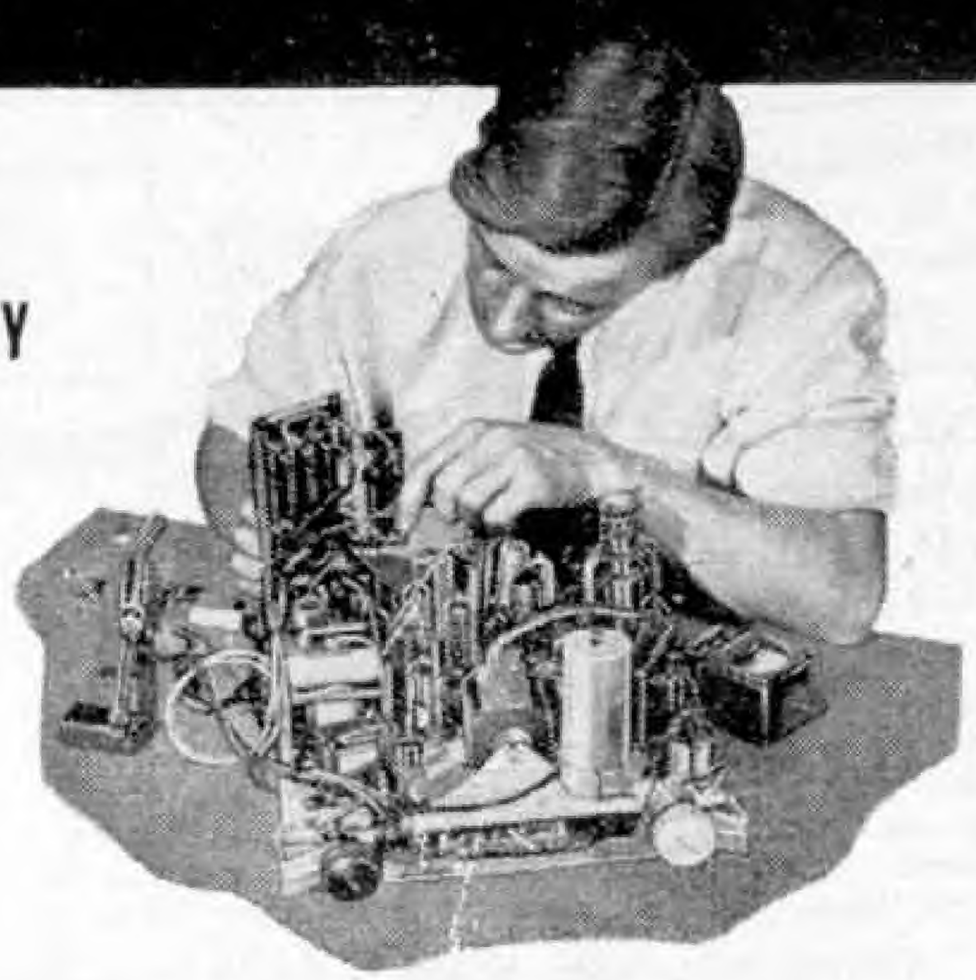
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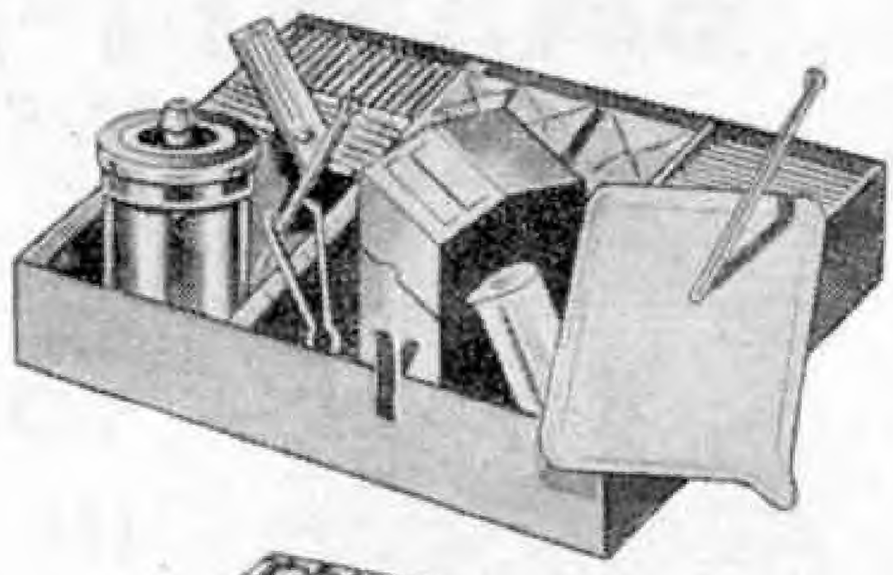
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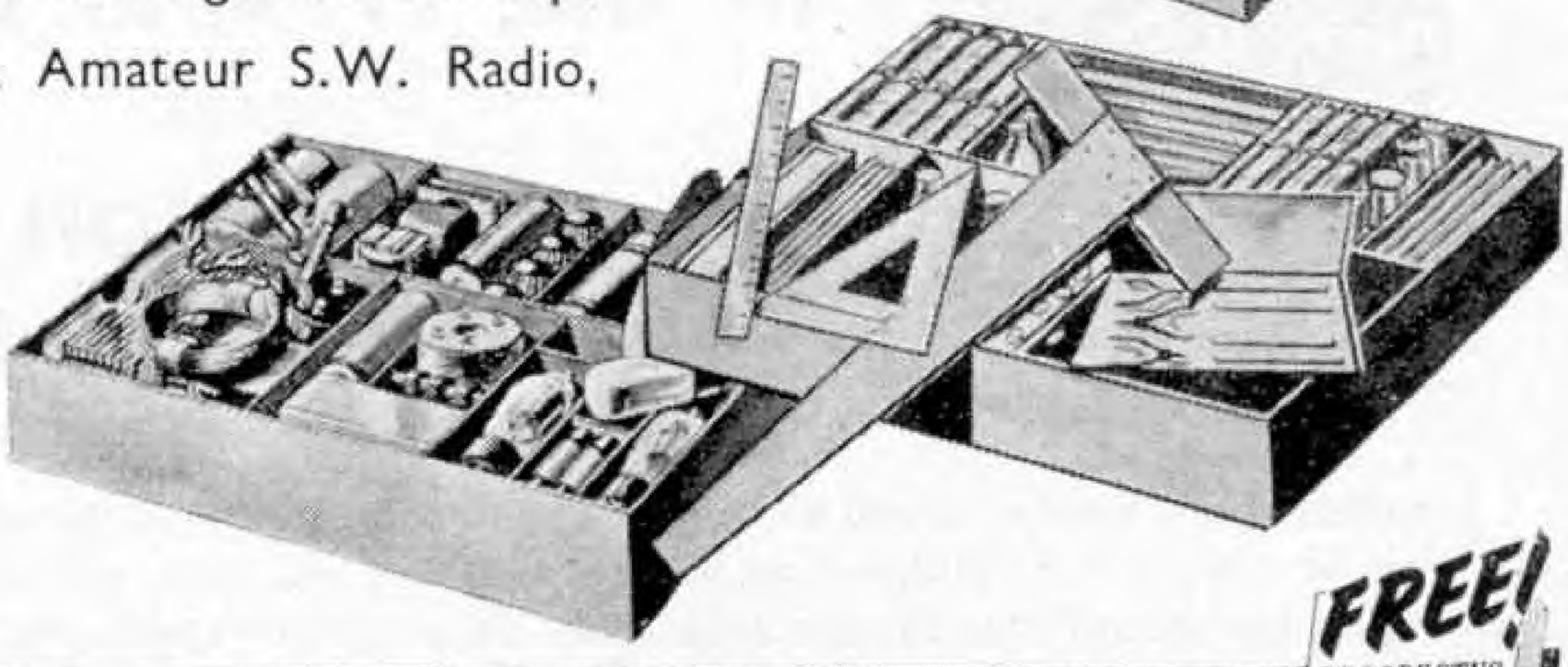


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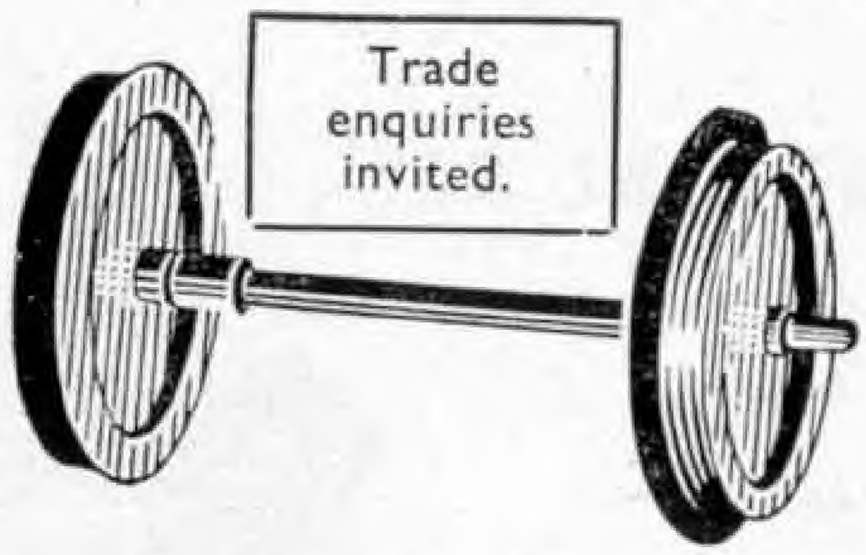
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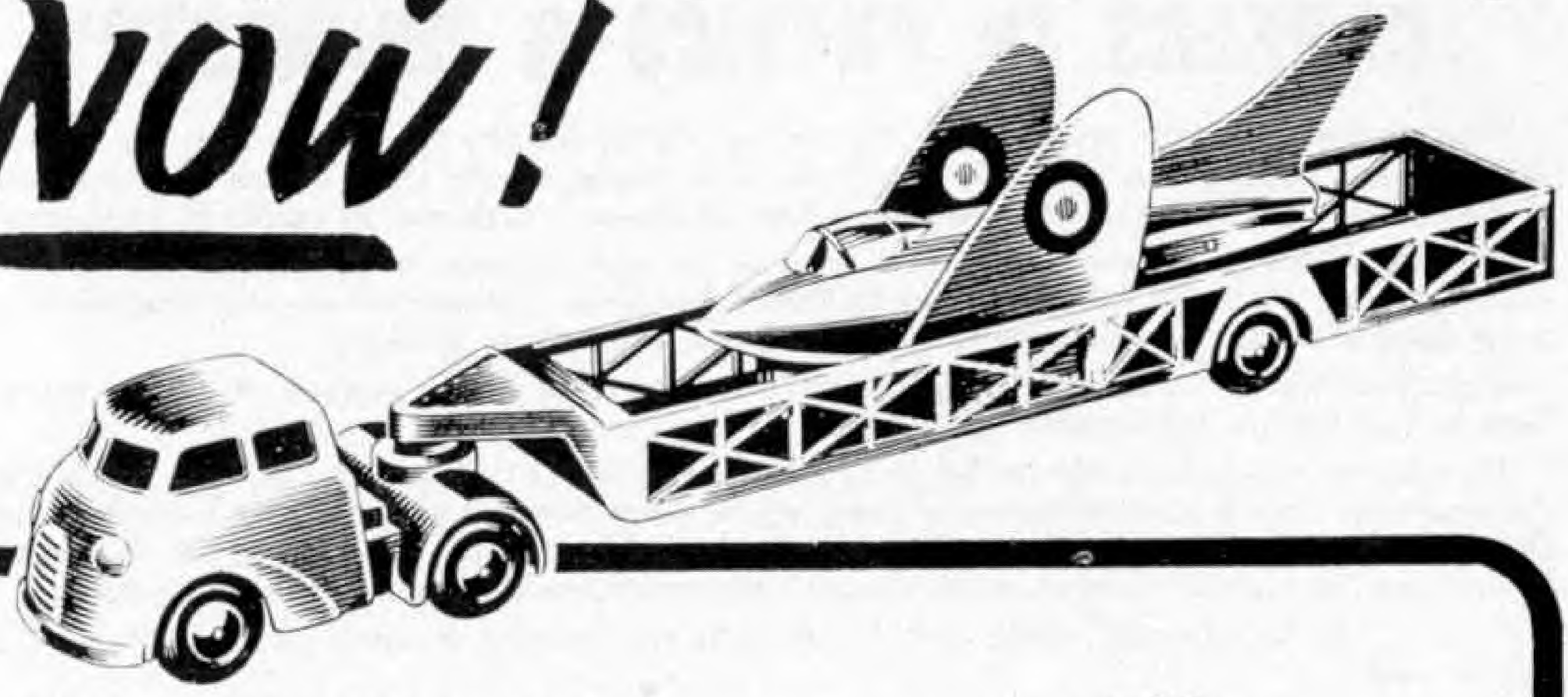
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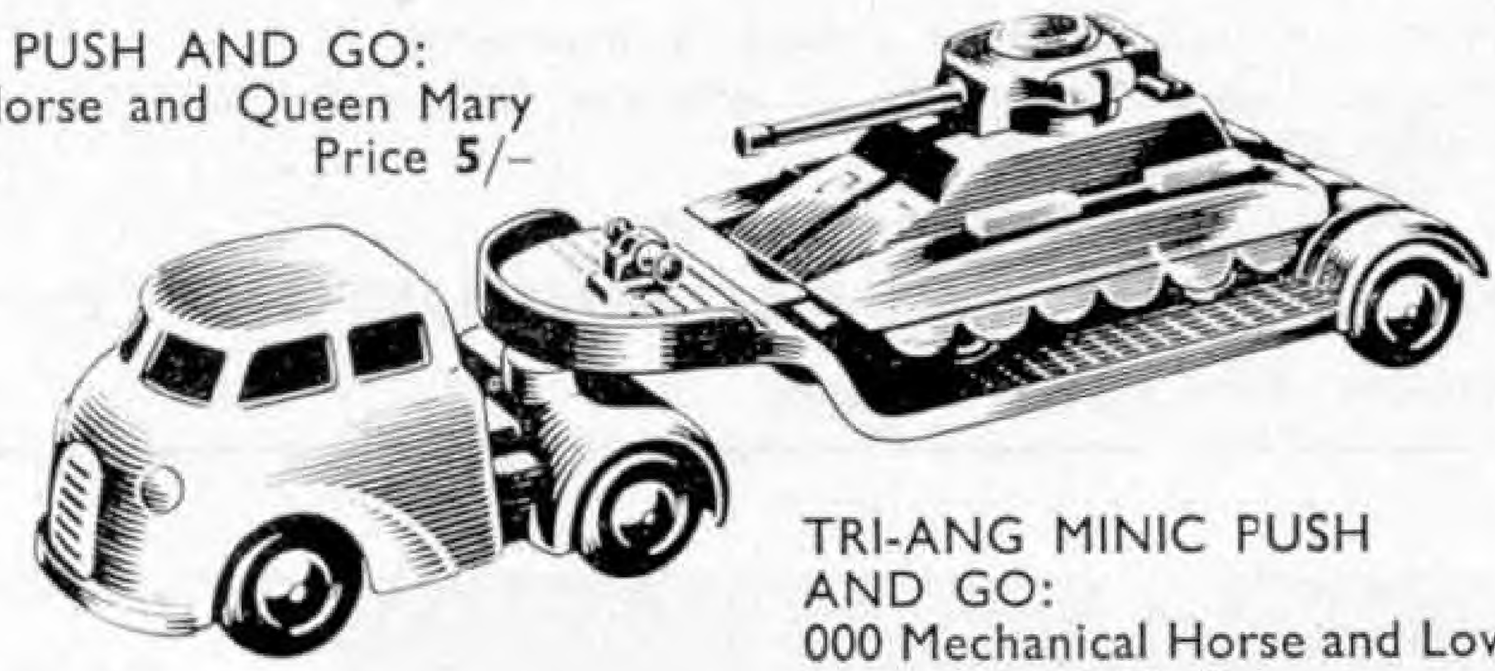
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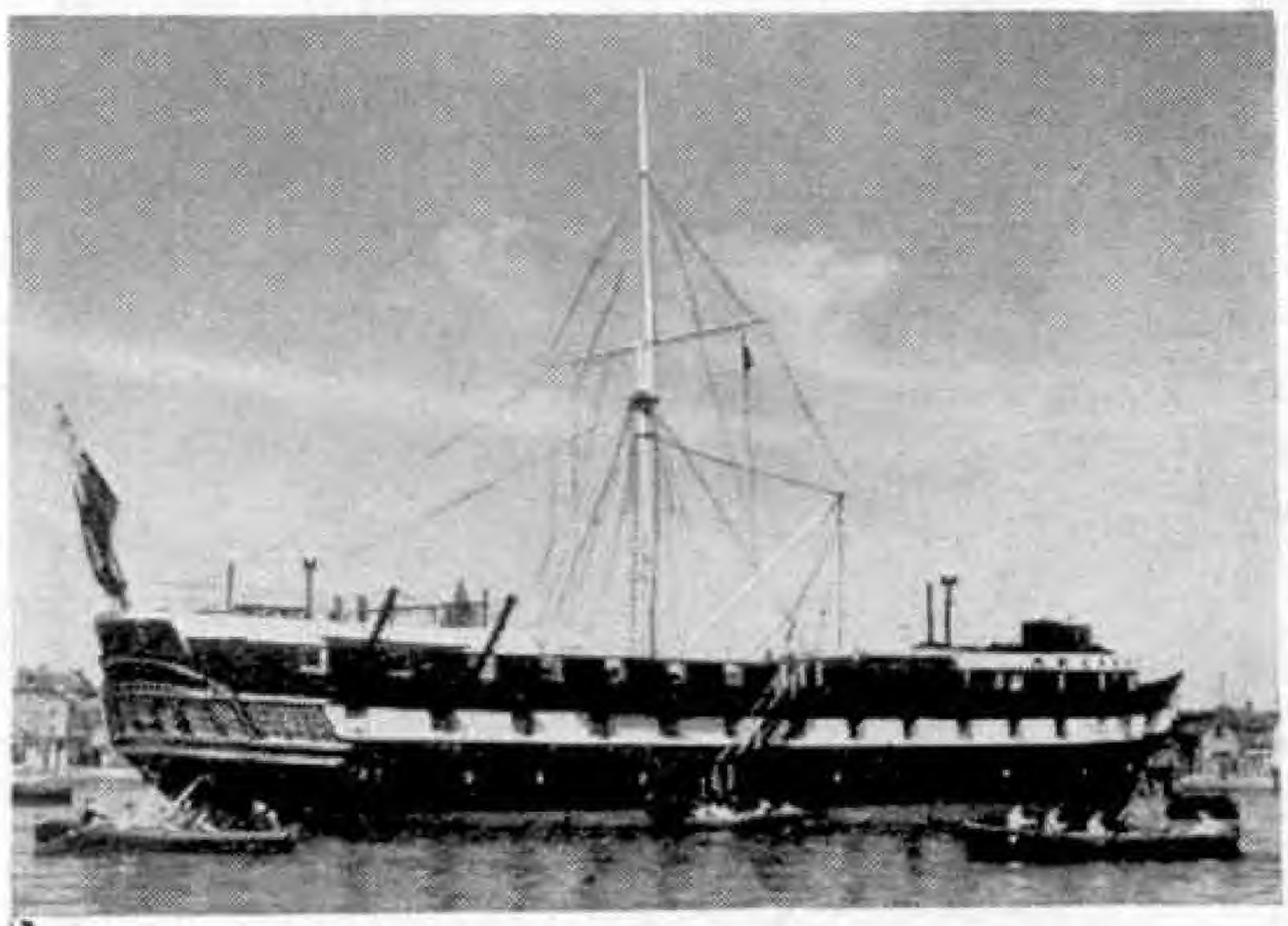
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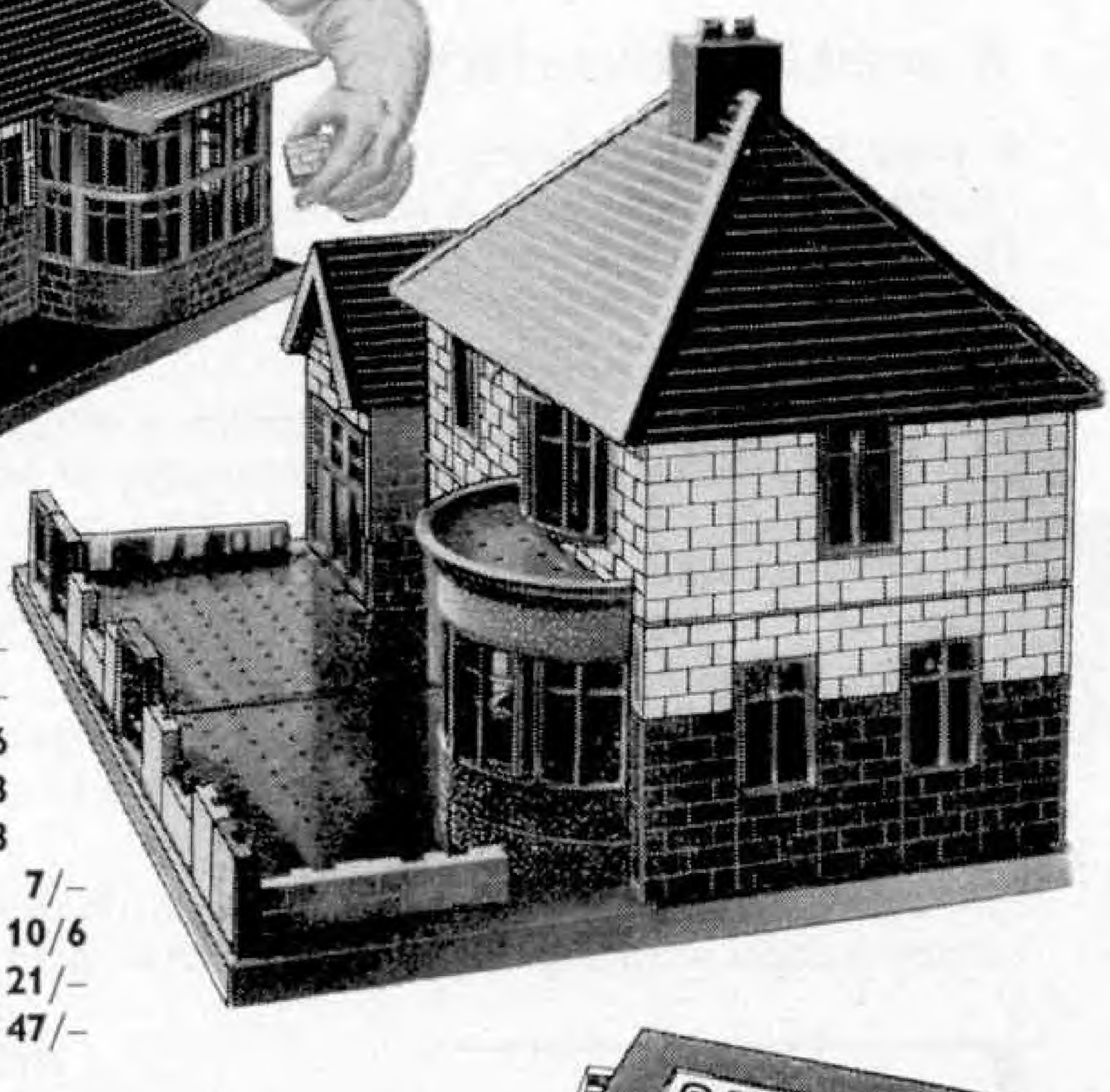
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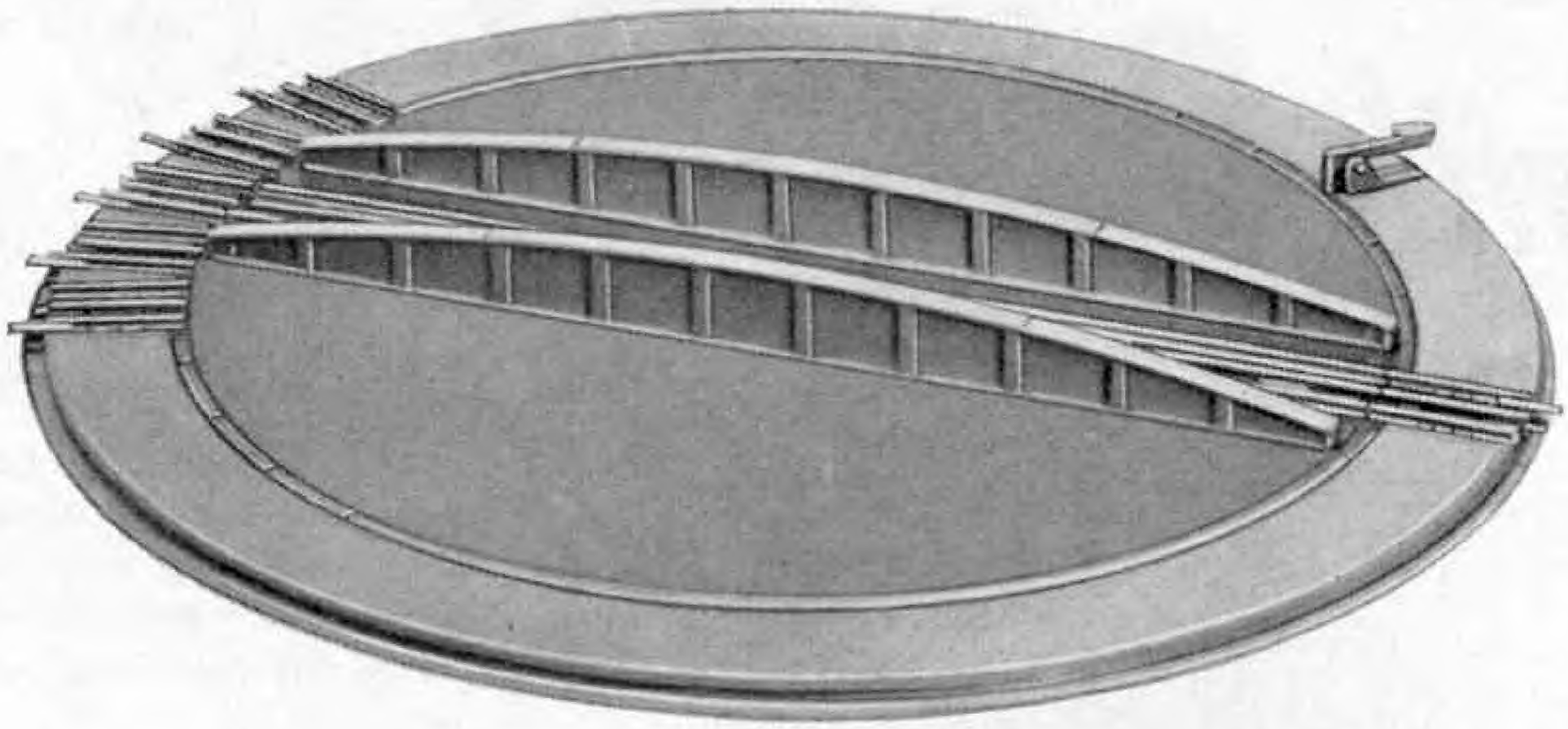


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See the special article about the HORNBY-DUBLO Turntable on pages 40 and 41 of this issue.

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Next Month: "FUN WITH YOUR BAROMETER"

MECCANO MAGAZINE

Editorial Office
Binns Road
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EDITOR : FRANK RILEY, B.Sc.

Vol. XLII
No. 1
January 1957

New Year Progress

There is progress at Llanfairpwllgwyngyllgogerychwyrndrobwllllantysiliogogogoch. By this time everybody knows where to find the station with this wonderful name, which was first painted on canvas hung on the station railings during the summer season. Then 12 years ago a porter improved on the sign by building a new one in rustic woodwork. Now his sign has gone, and in its place we have a resplendent effort in pressed steel, enamelled maroon with white lettering, and the B.R. Lion to guard it.



The latest version of the name sign at a famous L.M.R. station in Anglesey. Photograph by D. W. Field, Birmingham.

I have illustrated this example of "progress" because with this issue we begin new year by the calendar, and a new one for the *Meccano Magazine*. We all look for progress from one year to another, and New Year's Day is traditionally devoted to looking back over the past and contemplating the future, wondering if we can make improvement in ourselves during the coming year and if matters generally will be better ordered. Sometimes this does not happen; at other times we make decided steps forward. The Llanfair example will cover both contingencies, for while the good folk living there may regret the passing of the station sign of 1956, there will be others who will reflect that the 1957 sign, while not exactly a curiosity apart from the length of the name, is at any rate more easily readable than the other one.

Now is there to be progress for us? I hope that the 1957 Magazine will be an improvement on that for last year, or indeed for any previous year, and that it will continue to satisfy you and to attract new readers. All of you are enthusiasts, eager to make yourselves more knowledgeable and efficient in all your activities, whether you are still at school or have started your careers. I hope everyone of you will find that 1957 is a year of continual progress and that by the time it ends you will, like the sign at Llanfair station, have shown improvement in many directions—if not in all!

The Editor

The Tavern of the Seas

Cape Town and its Splendid Harbour

By the Editor

READERS will easily recognise the scene on our cover this month as Cape Town Harbour, with the city and Table Mountain behind it. Few ports have a lovelier setting than that of the gateway to South Africa, the oldest city in southern Africa. It lies in an amphitheatre formed by Table Mountain and its outlying flanks, Lion's Head and Devil's Peak, and these three, with Signal Hill, provide a background that entitles it to rank with such scenic ports as Rio de Janeiro and Naples.

The bay on which Cape Town stands is at the northern end of the magnificent Cape Peninsula, which extends southward for 32 miles. The flat-topped height at its northern end, aptly given the descriptive name of Table Mountain, has become almost legendary, and there must be few who have not heard of its "tablecloth," a layer of white mist that at times lies on it, as can be seen in the upper picture on the opposite page.

The southern end of the Peninsula is equally famous and historic, for it is the Cape of Good Hope. There is some ground for believing that this celebrated Cape was rounded by a Phoenician navigator about 600 B.C., but it really made its entrance into history 470 years ago, when the great Portuguese explorer Bartholomew Diaz sailed round it and so opened the way by sea to the East Indies. Diaz called it the Cape of Storms, presumably because he had uncomfortable times in rounding it on his outward and return passages, but such a name was not likely to provide much encouragement for future navigators, so it was quickly changed by the King of Portugal to the one by which it is now known.

Vasco da Gama, the founder of Portugal's Eastern empire, followed Diaz round the Cape on his three voyages to India, and it was sighted by Sir Francis Drake during his epic circumnavigation of the world in the *Golden Hind*. The great British seaman described it as "a stately thing and the fairest Cape we saw in the whole circumference of the Earth."

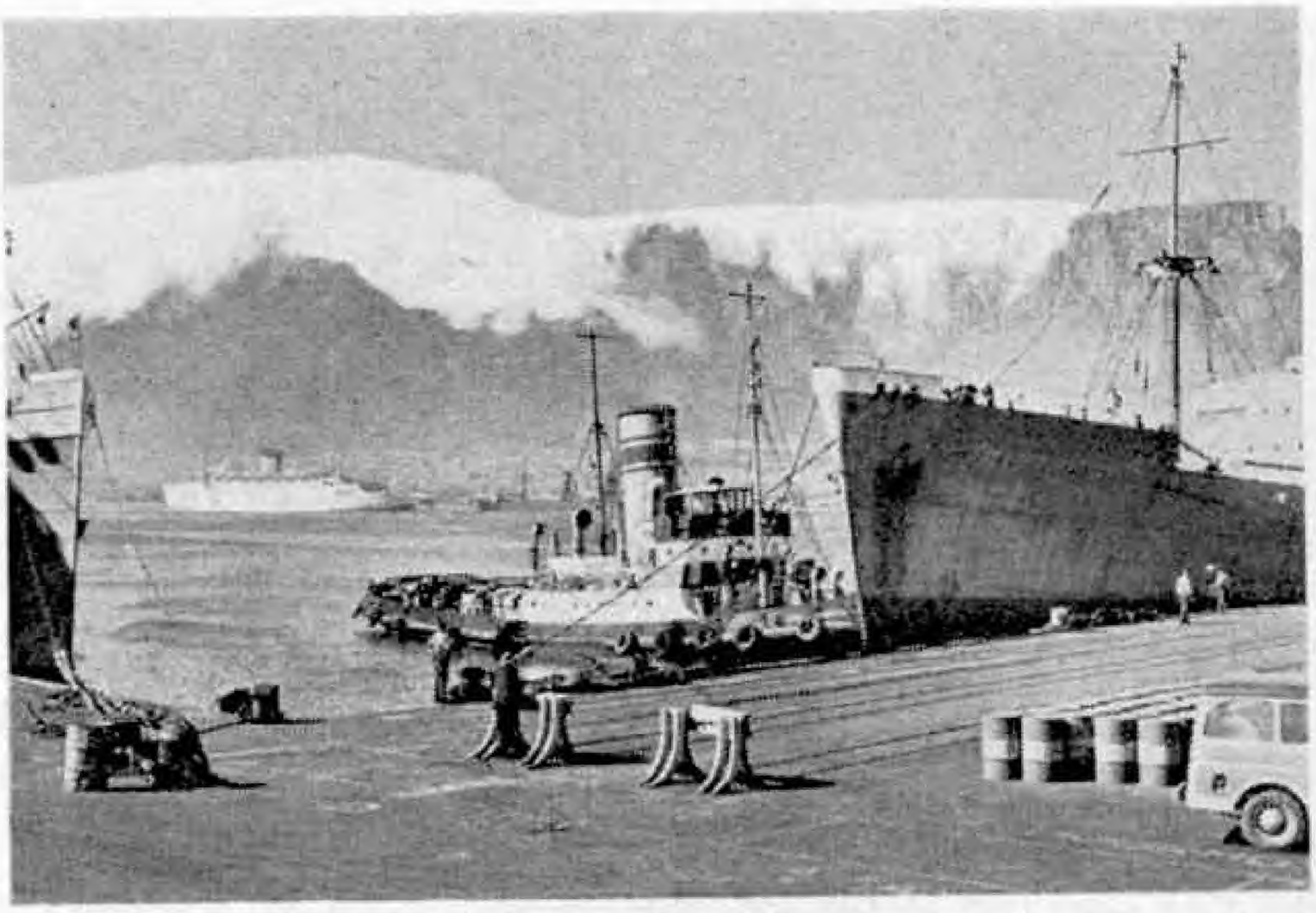


The wonderful view from the top of Table Mountain shows Cape Town below, with its harbour, and beyond it the fine sweep of Table Bay.

Later the Cape became well-known to British, Portuguese, Dutch and French navigators making their way to India and the fabulous Spice Islands of the East, who called there to replenish stocks of food and water by barter with the natives. It was the Dutch who first decided to establish an outpost in this delightful and convenient spot, and in 1652 Johan van Riebeeck, famous as the founder of Cape Town, sailed there with a company of settlers. Today his statue stands in the

city as a permanent memorial of this truly historic event, which has led to the growth of the Union of South Africa, with its population of Dutch, French and British origin, as a Dominion of the British Commonwealth.

A castle was built in 1666, and is still to be seen in Cape Town. It is indeed the oldest existing building in South Africa, star-shaped, with five bastions where guns are mounted, and surrounded by a moat. It was originally a fort for the protection of the settlers, but later it became the seat of government. Today it is open to the public, who can admire its architectural features and its state rooms, which house a fine collection of historical paintings, furniture and china.



Shipping in Cape Town Harbour, with Table Mountain, its top enveloped in its famous mist, in the background.

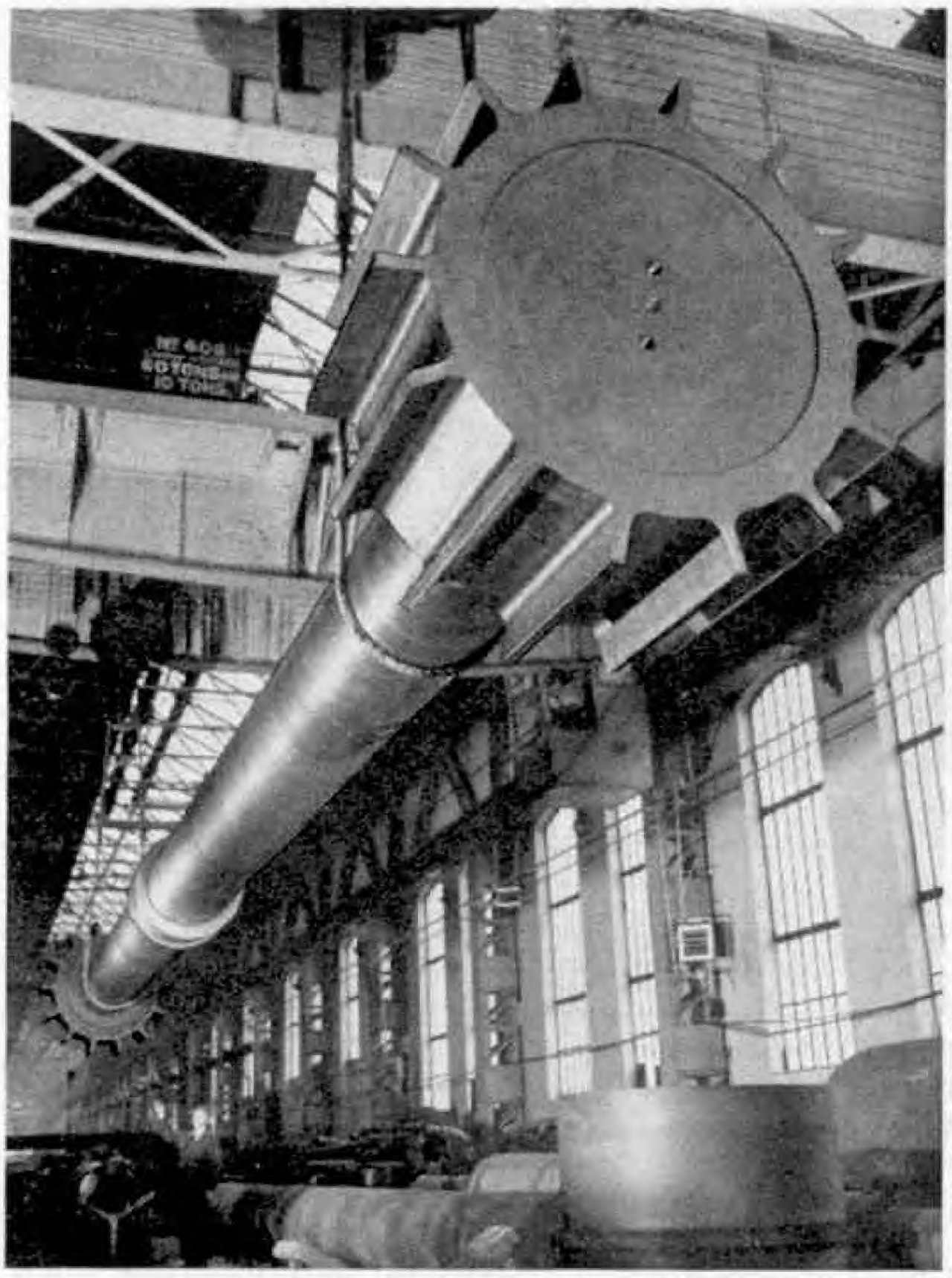
The Dutch owned and ruled the Cape for 154 years. It was occupied by the British in 1795, but was returned to Holland eight years later, finally becoming British again when war broke out in 1806.

Now Cape Town has developed into a city of 640,000 people. It is still the "Tavern of the Seas," the name it earned by providing refreshment for sailors, and in its harbour can be seen ships of all kinds, including great liners. It has modern and handsome buildings, as the lower illustration on this page shows, but many churches and other relics of its long and romantic past besides the Castle are still cherished. There are old houses, in lovely grounds, that are reminders of the Dutch who built their homes in this new land, with its remarkably mild climate, and brought their own architecture with them. The city also possesses a striking memorial of its historic association with the East. This is the Malay quarter, with its colourful processions, strange music and gay dancing, its mosques and minarets.



The Grand Parade, Cape Town. On the left is the City Hall. The illustrations to this article are reproduced by courtesy of South African Railways.

Cape Town's harbour has grown with the city. A start was made with the construction of the present harbour in 1935, and it was completed in 1945. The work actually added to the central portion of the city itself, for a large stretch of land with an area of 360 acres was reclaimed from the sea. The scheme added to the existing Victoria Basin the magnificent new 290-acre Duncan Dock, and the largest graving dock in the Southern Hemisphere. The bay is sheltered, and shipping in it well protected from the storms that prompted Diaz to describe the southern tip of the peninsula as the *Cape of Storms*.



A hollow transmission shaft, nearly 60 ft. long and weighing 42 tons, made at Sheffield for use in the steelworks of John Summers and Sons Ltd., Shotton.

A 42-Ton Transmission Shaft

By the Editor

THE enormous hollow steel shaft shown in the illustration at the head of the page weighs 42 tons. It is 57 ft. 2¼ in. long and 2 ft. 4 in. in diameter, and has a bore of 20 in. It was made with meticulous accuracy, and when it was given its final inspection it ran true to a thousandth part of an inch on its three bearings, one at each end and one in the centre.

The shaft was forged and finished by the English Steel Forge and Engineering Corporation Limited at their River Don Works, Sheffield. At each end what is known as a Holset coupling member is fixed. These can readily be seen in the picture. They are concerned with the drive that the great shaft transmits, and it was found on test that all 14 blades of each of these members were truly in line with both the axis of the shaft and with the corresponding blades on the opposite member. The Holset coupling members are each 34½ in. wide.

Both shaft and Holset coupling members were machined from solid forgings, and then came the assembly, which called for the greatest possible care and accuracy.

The first operation was the most difficult. Plugs 35 in. long had to be aligned exactly with the bore and manipulated carefully into position in the ends of the shaft while these were unsupported. The shaft ends were heated for this process, so that when they cooled down they gripped the plugs firmly.

Two other shrinking operations then followed. At the middle of the shaft are two thrust collars, each 3 in. wide, which have an outside diameter of 36 in. These also can be seen in the picture. Throughout the assembly these collars had to be kept heated, to expand them so that they could be set in position on the machine shaft 25 ft. from its end. Finally the members of the couplings themselves were expanded by heating and placed over the ends of the shaft in the position they were to occupy. On cooling all components were then found to be exactly in position.

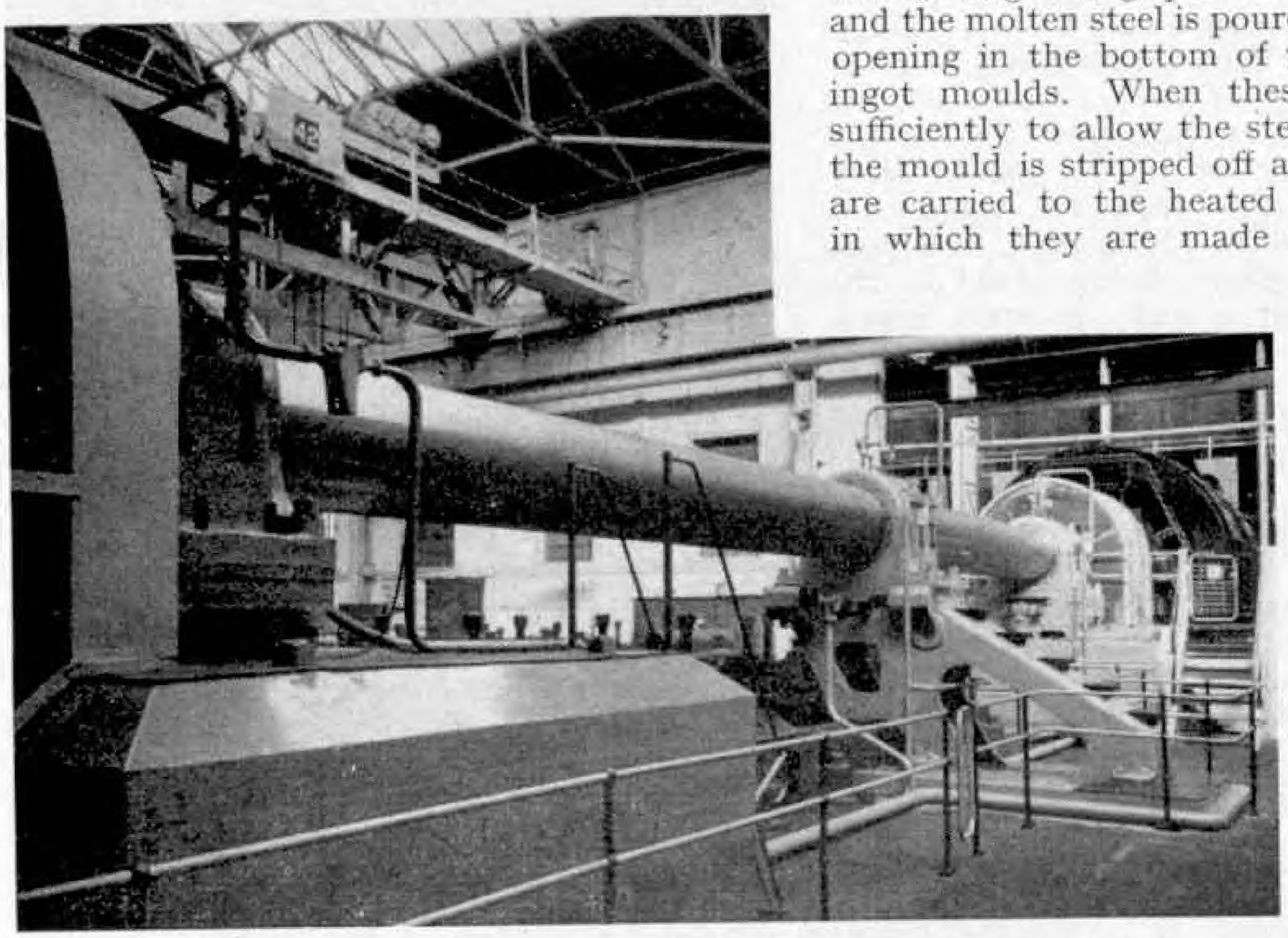
No small part of the success of this engineering achievement was due to the use of machine tools capable of taking work of this magnitude. The finish machining of the shaft was carried out on a lathe capable of taking work up to 80 ft. in length.

The shaft was constructed to provide the drive from two 3,500 h.p. electric motors in tandem to a slabbing mill at the Hawarden Bridge Steelworks of John Summers and Sons Ltd. The illustration on the opposite page shows the coupling in position, in its bearings, one at each end and one in the middle, as I saw it on a visit to the works. The thrust collars of course are not visible in the second illustration, nor are the Holset couplings. The outer member of each of these has blades pointing inward, to correspond with those pointing outward of the corresponding inner member, and in

building them up wedge-shaped rubber blocks are placed between the blades. These are of large area, so that the stresses set up when one of its members is driving the other are well distributed. The combination provides a resilient coupling, the rubber blocks between the blades of the inner and outer members changing their shape under pressure when the drive is operated.

A shaft over 57 ft. long was required in this instance because the drive had to be transmitted from electric motors to the slabbing mill over an existing steam engine.

The 42-ton transmission shaft in position. It transmits the drive from two 3,500 h.p. electric motors in tandem to a mill that rolls white hot ingots of steel into slabs. Photograph by courtesy of John Summers and Sons Ltd.



The steelworks of John Summers and Sons Ltd., are on Deeside, a few miles below Chester. They cover some 530 acres, and give employment to nearly 10,000 people. In them there are 76 miles of works railways and 12 miles of roads, and 7,000 wagons are handled in main line traffic every week.

A large part of the works is built on land that has been reclaimed by pumping sand on to it from banks in the Dee and on the surrounding marshes. The sand is very fine, and when pumped into position it compacts easily, setting solid within hours of being pumped.

The story of the production of steel on Deeside really begins with the delivery of iron ore at Bidston Dock, Birkenhead. From there the ore is carried in 65-ton wagons by rail to the works, where it is stored on a site from which it can readily be taken to the two blast furnaces, which have hearths measuring 27 ft. across. With coke from coke ovens within the plant, and limestone, the ore is fed into the top of the blast furnaces, which smelt out the iron. This is tapped off in the molten state and run into 75-ton transfer ladles set on rail cars.

The next stage is to convert the molten iron into steel. This is carried out under careful control in basic open-hearth furnaces, the charge including scrap iron and steel as well as molten iron. The molten steel is tapped into giant casting ladles, slag being poured off the top, and the molten steel is poured through an opening in the bottom of the ladle into ingot moulds. When these are cooled sufficiently to allow the steel to solidify, the mould is stripped off and the ingots are carried to the heated soaking pits, in which they are made white hot in readiness for conversion into slabs.

It is in this conversion that the slabbing mill driven by means of the huge steel shaft shown in our pictures is concerned. The white hot ingots are lifted in turn from the soaking pits in which they have been reheated, and fed into the mill from the entry side. There they pass under a "pulpit", through the glass windows of which the operators can watch the progress of the ingots, which are squeezed into the form of slabs about 12 to 15 ft. long, up to 4 ft. 6 in. in width, and 4 to 6 inches thick by passage between the heavy rolls of the mill.

These slabs are the raw material for the

(Continued on page 50)

Stories in Almanacs

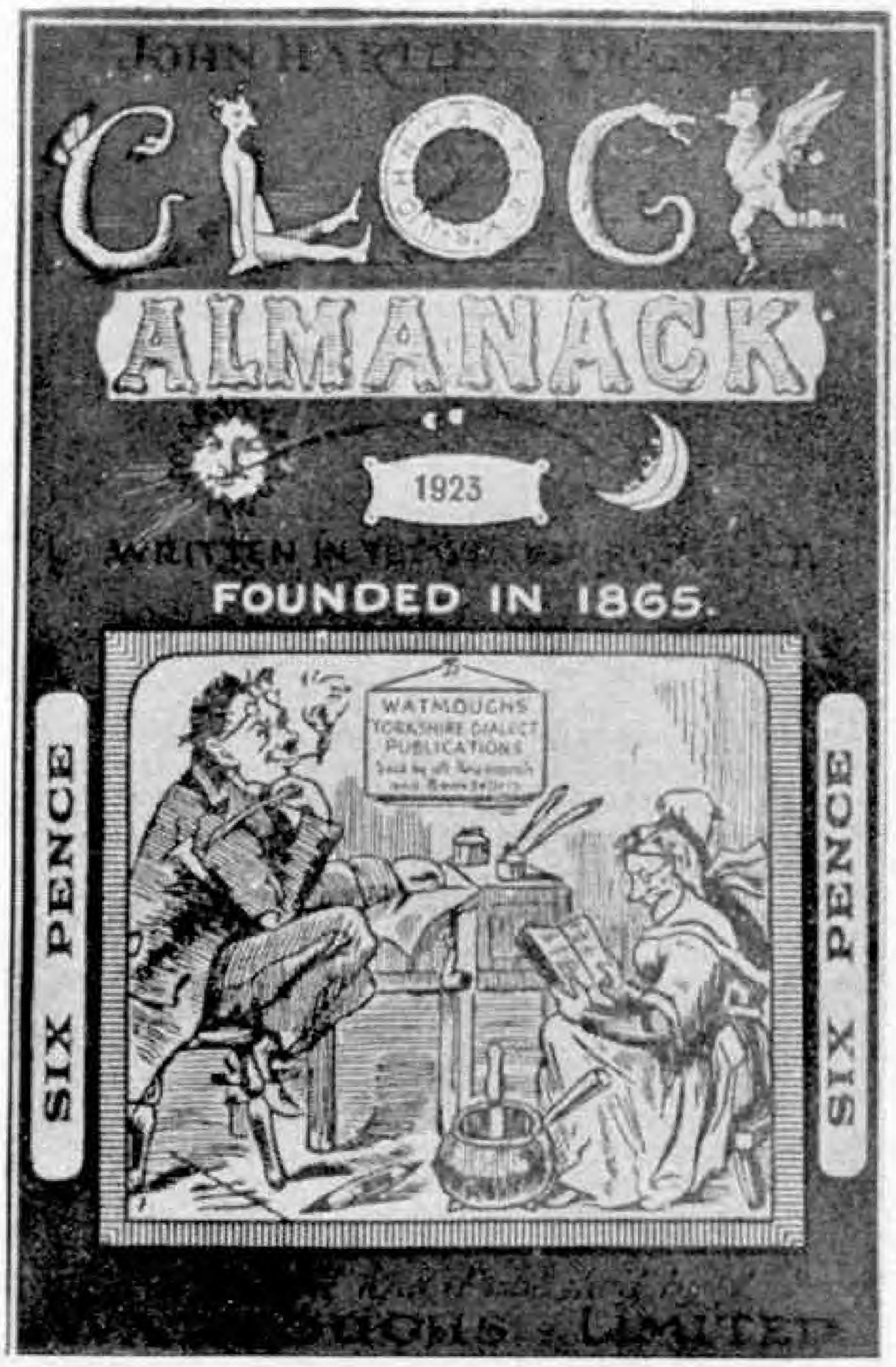
By Arthur Nettleton

ALTHOUGH we may smile at the deliberately vague predictions in the almanacs that appear on the bookstalls at Christmas, no other type of publication has had such a long and absorbing history. The story of almanacs goes back far beyond that of newspapers —farther back, indeed, than the beginnings of printing.

Ever since Pharaoh had his dreams interpreted by Joseph, almanac makers professing to foretell the future have never lacked customers. Today, though the variety of such works is not as great as it once was, there is a ready market for them. Some examples sell to the tune of more than 500,000 copies every year. They are read as eagerly in Pittsburgh as in Plymouth, and are consulted in places as far apart as the Canadian prairies and the open spaces of Australia. In the U.S.A. they rank as the next best-sellers to the Bible, for Uncle Sam is an avid reader of prophetic publications.

The idea of publishing forecasts of important happenings in the coming year originated at least 3,000 years ago. The oldest almanac so far discovered was compiled during the lifetime of Rameses the Great, the alleged oppressor of the Israelites. Like many examples today, it indicated the "lucky" and "unlucky" days of the next twelve months, and it followed the still common practice of marking the "unlucky" dates in red.

In addition there are notes concerning religious observances, a reminder that almanacs were, and still are to some degree, connected with religion. At one time every Church psalter in England had to have an almanac at the front, though the most entertaining almanacs from that period are those that were published separately, enabling learned Churchmen to dabble in astrology.

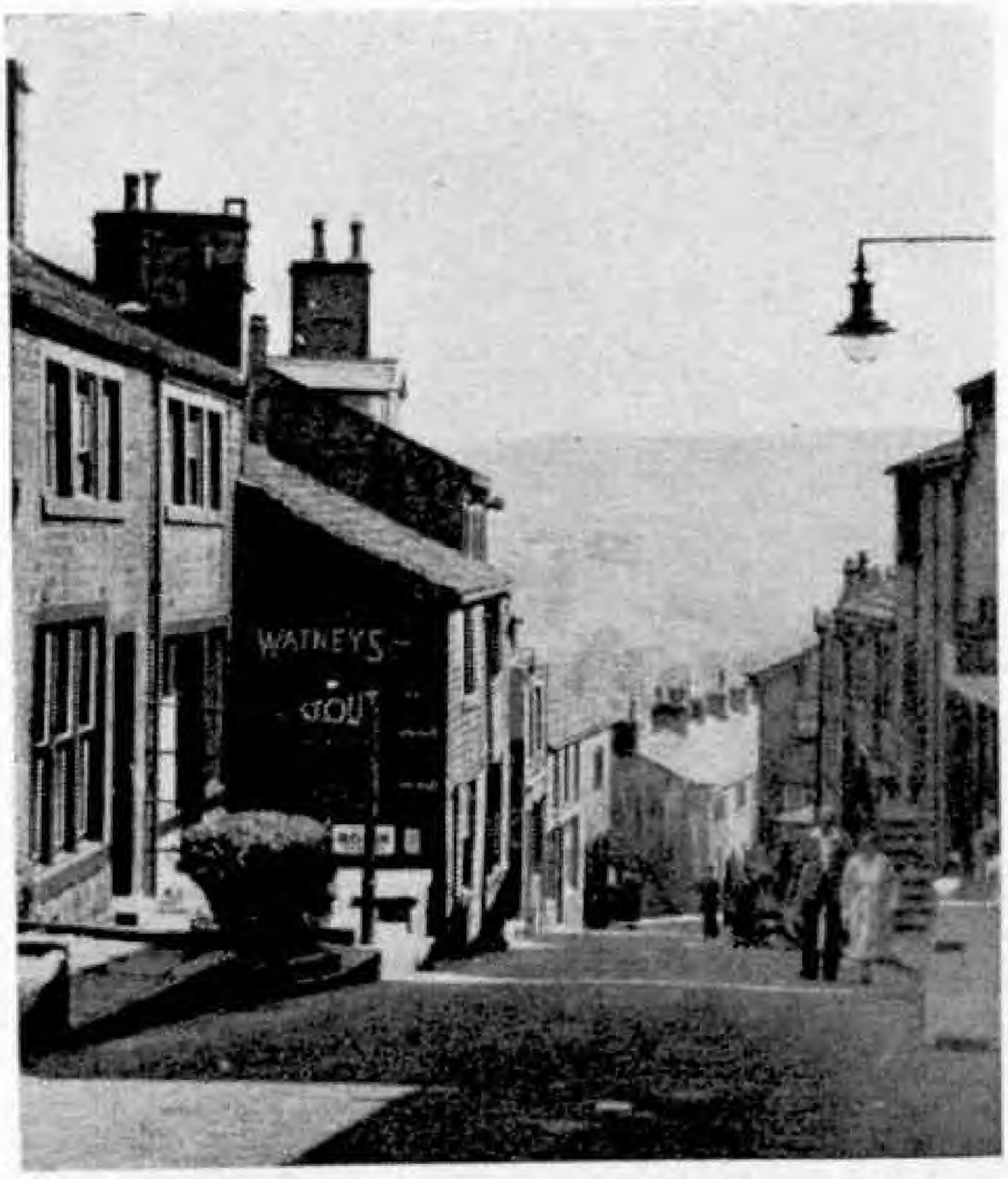


Almanacs professing to foretell the future were issued at least 3,000 years ago in ancient Egypt. At the head of the page is the cover of a modern almanac. This was founded more than ninety years ago, with dialect contributions by John Hartley, and is now known not only in the West Riding of Yorkshire, its birthplace, but all over the globe.

Even in this twentieth century a copy of every almanac issued by the Stationers' Company is presented to the Archbishop of Canterbury. The custom is a link with the period when prophetic works were copied out by hand in monasteries. Before printing was invented, in the 15th century, considerable numbers of scribes were engaged on the work, and Caxton's introduction of the printing press soon "deprived hundreds of their bread," as one chronicler describes it, by robbing almanac copiers of their livelihood.

On the other hand, printing gave a big impetus to almanac publishing in general, and by Elizabethan days these works had become so popular and influential that it was considered essential to control them.

Almanacs, it was felt, might be used by enemies of the realm to destroy public confidence, and deliberately detrimental forecasts might become a threat to national security. So a licence to publish authorised



Main Street, Haworth, a West Riding town which had an almanac of its own for several years.

editions was granted to the Stationers' Company, one of the old London guilds, and unauthorised editions were banned.

The Company held the monopoly until James I extended the licence also to the Universities of Oxford and Cambridge. Later still the guild regained the sole rights, and only in comparatively recent times has it been permissible for other publishers to issue almanacs.

Before this stage was reached, some publishers of "pirate" editions suffered imprisonment for printing them, and several law suits were fought over the matter. The 17th and early 18th centuries brought many kinds of almanac. During the Civil War this branch of publishing reached a new height of importance, Cromwell engaging William Lilly, a noted astrologer of the time, to issue almanacs for the Commonwealth cause.

Lilly was astute enough to forecast resounding Roundhead victories. He continued to publish almanacs for many years, and a memorial to him is in the parish church at Walton - on - Thames, Surrey.

His successor in the role of England's leading almanac publisher was Francis Moore—the original "Old Moore." Though most people today think that Moore was just a legend, he was actually a "quack" doctor who published prophesies as part of an advertising scheme for his pills and potions.

His first almanac was issued in 1701, when he was only 26 years old, and he died at 47, so it is hard to understand why he has always been known as "Old" Moore. His first prophetic work was a fraud, too, being based very largely on another almanac.

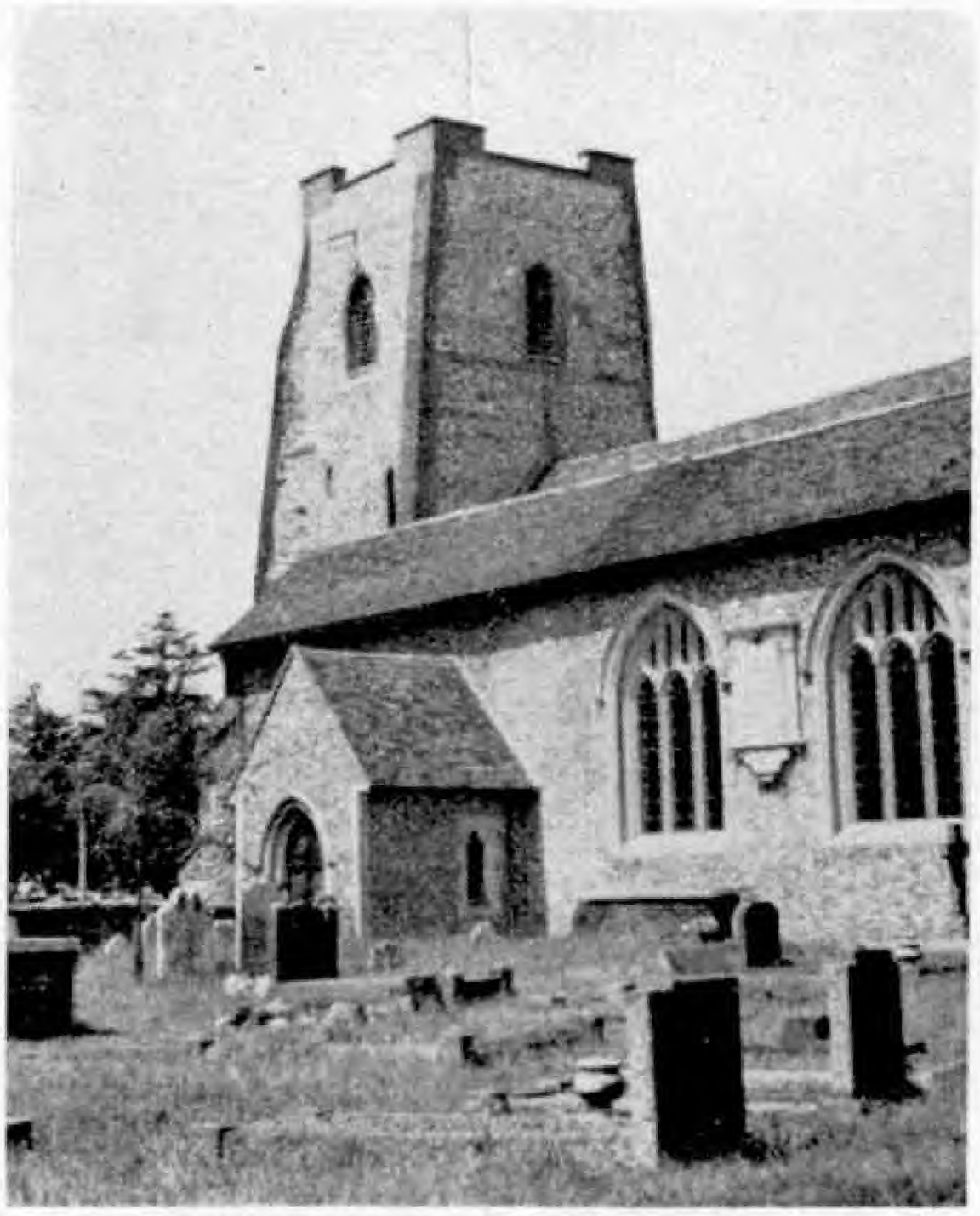
Scarcely less renowned at one period were the almanacs of John Partridge, a shoemaker who soon found that rudimentary medicine and astrology were more profitable than cobbling. He became so widely-known as a healer that he was summoned to Court. Henceforward he called himself "Physician to His Majesty," and the sales of his prophetic booklets soared.

Despite the widespread popularity of his almanacs, however, Partridge was ridiculed by some of the literary lights of the early 18th century. In 1708 Dean Swift circulated a satirical *Predictions for the Ensuing Year*, in which he foretold Partridge's death on a certain date. Although Partridge later stoutly asserted



The Yorkshireman Comic Almanac, one of many local annual prophetic publications issued during the nineteenth century.

Walton-on-Thames parish church, Surrey, closely associated with the 17th century almanac-maker William Lilly.



that he was still alive, he never regained his popularity and was completely forgotten. Swift's burlesque did much to "prevent the people of England being further imposed upon by the vulgar almanac-makers," as he put it.

Yet almanacs entered another halcyon period about 100 years ago. The advance of education and the decline of illiteracy ensured an expanding market for them during the second half of the 19th century.

Scores of towns and even villages began to have almanacs of their own. There were editions for particular sections of the community, such as engineers and weavers, there were almanacs in dialect, and there were comic ones. Others, such as one published at Pateley Bridge, Nidderdale, were veritable encyclopædias, containing a wealth of general information as well as forecasts.

Even churches issued almanacs. One was published in connection with Pinner Church, Middlesex, until 1907. In this instance, the contents included a summary of past events at Pinner, and the almanac gives instructive sidelights on local affairs.

Few of the 19th century local almanacs are still published, but from 1865 comes a famous one that continues to appear each December. This is John Hartley's *Clock Almanac*, which is in fact known all over the world and not just in the West Riding of Yorkshire, its birthplace. Dialect verses by John Hartley, who had been in turn a pattern designer, theatrical producer, newspaper canvasser, and elocutionist, helped to popularise the *Clock Almanac*, and within a few years it was achieving five-figure sales.

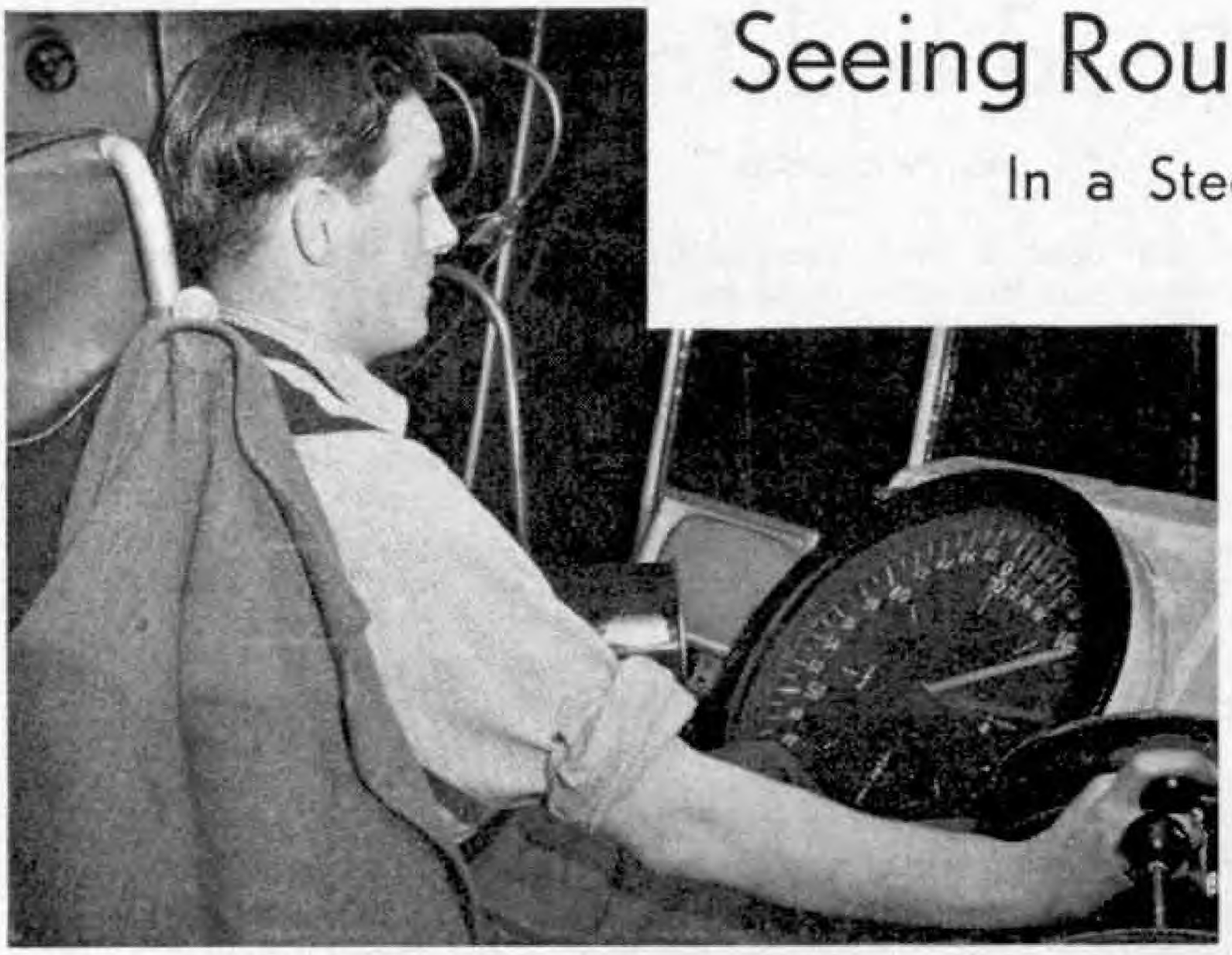
A number of sayings in common use today were originally coined for such publications. Among these are such proverbs as *God helps those who help themselves* and *Forewarned is forearmed*. Those pithy sayings were first published in *Poor Richard's Almanac*, an American edition issued by none other than Benjamin Franklin, the famous American statesman! His almanac, started in 1733, was one of the most popular ever published.



The parish church at Pinner, Middlesex, in connection with which an almanac was issued yearly until 1907. But this was a record of past events rather than a collection of forecasts.

Seeing Round Corners

In a Steelworks

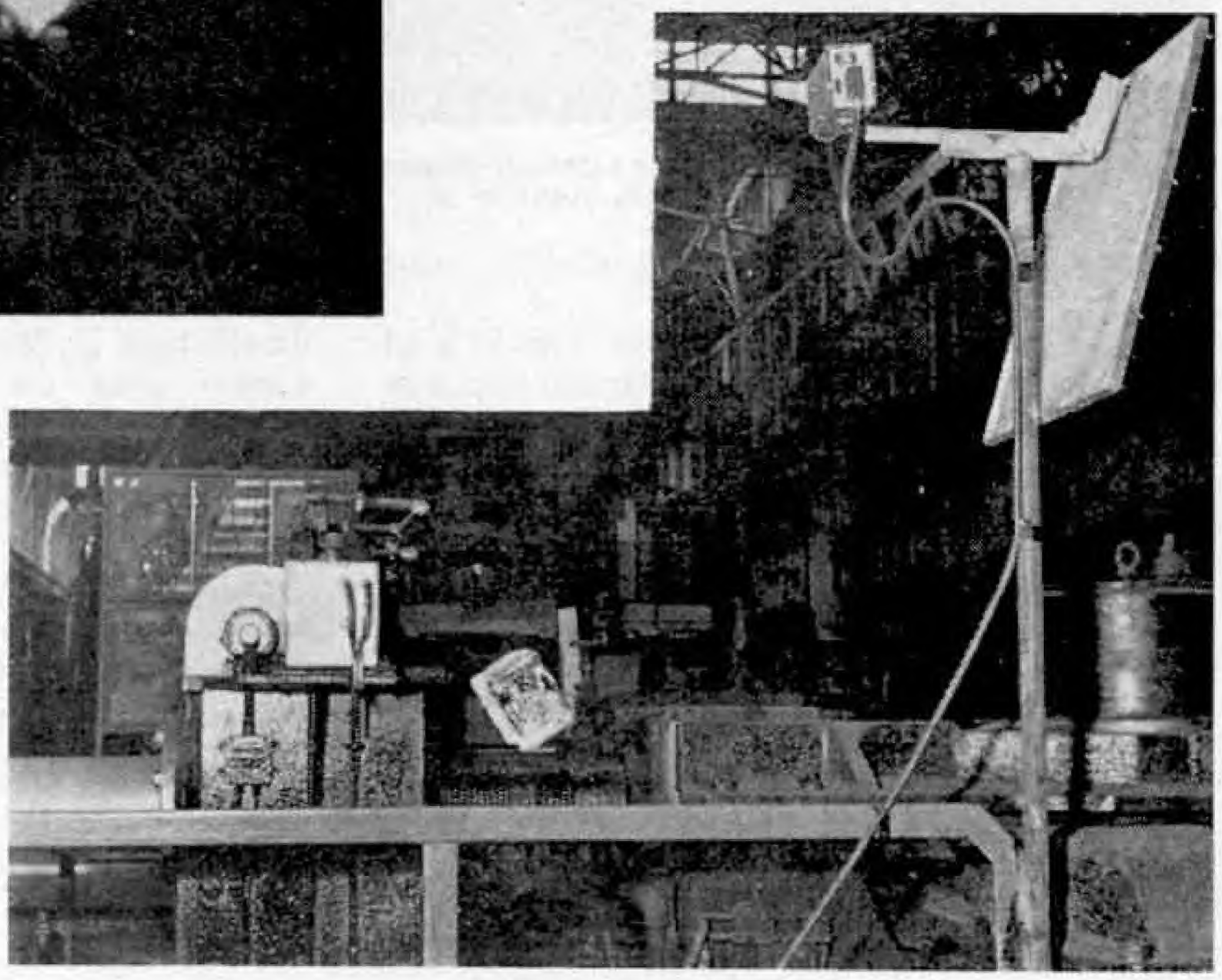


IF you want to see round corners, or into some remote place, clearly one way that you would think of nowadays would be by using television. This is being done on an increasing scale in industry, and the pictures on this page show an example of its application in this sphere.

In the Abbey works of the Steel Company of Wales, where indeed the provision of television had already been arranged, an emergency arose when a slab manipulator broke down. Because of this an overhead crane fitted with a special hook had to be brought into use to turn over the white-hot ingots. The operator did not have a continuous view of this proceeding, and so could not be certain when the crane had finished its job.

In a few hours television equipment to guide him was obtained from the Marconi works at Chelmsford, and installed and tested. In our uppermost picture the operator is checking the position of an ingot on the television screen on his left, and that at the foot of the page shows the ingot, with the television camera, at the top of the picture, keeping an eye on it for him. In the centre is the television picture on which the operator follows the progress of the ingot.





Road and Track

By Peter Lewis

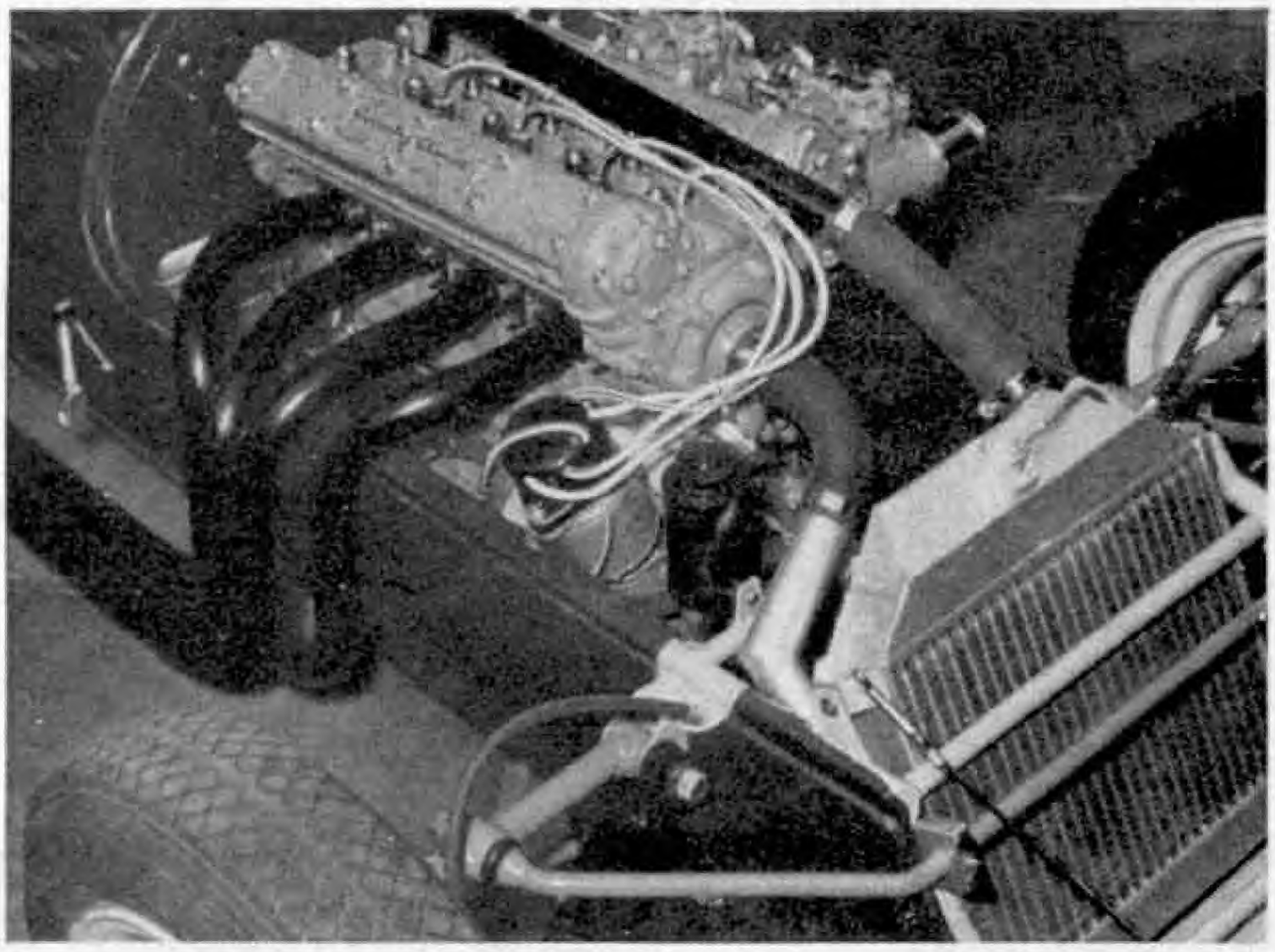
RECENTLY I drove a car that is so advanced in its design that one has to handle it personally to appreciate what has been achieved by the manufacturer. It is, of course, the Citroen D.S.19.

The secret of this fantastic motor car is hydraulic energy. A seven piston pump, driven by the engine, transfers fluid from a large, easily accessible reservoir under the bonnet to an accumulator, where constant pressure is maintained by a control valve. The accumulator feeds the brake system, suspension units, clutch, gear-box and steering as required.

There is no clutch pedal on the D.S.19 and, as I moved the dashboard change speed control to engage first gear, a valve admitted fluid under pressure into a hydraulic cylinder that operates the clutch control. Automatically the clutch disengaged, while at the same time fluid under pressure was admitted into the cylinder controlling the mechanism of first gear. Selector shaft, fork and gear were set in motion, and as first gear was engaged the clutch automatically re-engaged.

A touch on the accelerator and we were away. Ten miles per hour, then twenty and I took my foot off the accelerator, moved the change speed control one more position to the right, and allowed hydraulic energy to engage second gear. And so on for third and fourth gears.

When I braked, the effect was astounding, and the clutch automatically disengaged as I pulled up. Then I tested the suspension over the undulations of Farnham Common, Bucks. Each wheel is independently sprung and connected to the body by a suspension unit comprising a hydraulic cylinder and a sphere containing gas under pressure. The up and down movement of the wheels compresses the gas and provides a cushioning effect between the wheels and body.



Although of only 1½ litres capacity, the Coventry-Climax F.P.F. engine develops over 140 b.h.p. Photograph by courtesy of "Motor Racing".

Formula II

Fuel permitting, I think we are going to see some close and exciting motor racing under the new Formula II, which is introduced officially this month for the years 1957, 1958 and 1959. The formula is for unsupercharged cars up to 1,500 c.c. and does not replace the current Formula 1, under which the World Championship events are run.

Last season we saw the impressive new F.II Coopers in action and then, at Earls Court, we were able to examine Colin Chapman's challenger in this class, while the new F.II Lister was on show in a West End showroom. The experience gained by Cooper, Lotus and Lister in the sports car field over recent seasons has been incorporated in the new racing cars, and Great Britain is well prepared to meet the expected strong continental challenge in this vitally important field, where victory will carry valuable international prestige.

All three British *marques* will use the latest 1,480 c.c. Coventry Climax racing engine—a four cylinder lightweight twin overhead camshaft unit of entirely new design.

It is claimed that the power output is

141 brake horse power at 7,000 revolutions per minute.

Goodwood

Every year, at the Goodwood circuit in Sussex, the Guild of Motoring Writers



The Citroen D.S.19 has many advanced technical and styling features. The car is as many years ahead of its time as was the famous Light 15.

organises a Test Day, when members are able to try out the latest British cars. We are allowed three laps in any one car—approximately seven miles—and during the course of the day I managed a fairly full programme.

I had planned this mainly around the sports cars, including the Triumph T.R.3, the Austin-Healey 100-6, the X.K. 140, the M.G.A. and the Lotus. Undoubtedly, my most exhilarating drive was in Graham Hill's Mark XI Lotus, with the twin carburettor 1,172 c.c. Ford Ten engine. The power developed all through the range by the Ford engine is quite remarkable, and the roadholding equally so. The car went up to 5,000 revs.—about 90 m.p.h.—in no time at all on Lavant Straight.

It is easy to understand why people race, even without a hope of finishing in the first three. It is for the sheer joy of unrestricted speed, the almost frightening feeling of power as the car accelerates on the exit from a corner, and the sheer satisfaction of placing the car right for a corner and going into it at the right speed and on the correct line. Does it really matter if one does not win?

Jumbos

The radio fleet of the Automobile Association has recently been reinforced by the addition of a second mobile H.Q. office, to be known as Jumbo II.

The first mobile office was brought into use in June 1955 and has been highly successful. During the winter months both Jumbos will be located at strategic points, one at Scotch Corner on A.1., where motorists choose their route to Scotland, and the other at Andoversford on A.40, near Cheltenham, and will operate as reporting centres during bad weather, as well as providing all the normal A.A. services.

Each Jumbo has an illuminated weather chart—a mica front with a light behind it—and special chalk that glows like fluorescent paint is used to mark up weather conditions in code. If road communications in any particular district are seriously curtailed, then a Jumbo can be despatched to the area as an Emergency H.Q., working in liaison with the local radio patrols.

Seddon Diesel engines power the nine-ton vehicles, which are 33 feet long and have telescopic aerials with a radio range of 30 miles.



The radio control network of the Automobile Association now incorporates two of these mobile headquarters, known as Jumbos.



The first of the ten new Douglas DC-7C air liners for British Overseas Airways Corporation.

Air News

By John W. R. Taylor

B.O.A.C. Buys Boeings

Although some people have criticised B.O.A.C. for ordering fifteen of the big 107-170 seat Boeing 707 jet air liners for use on its transatlantic services, there was no alternative if the Corporation is to meet international competition on this important "prestige" route from 1960 onwards.

Long before then, it should set the pace between Britain and America with its long-range turboprop Britannia 312's; but some passengers will, in due course, prefer the greater speed of jet-liners to the quiet comfort and lower fares of the Britannias, and B.O.A.C. must meet this demand. Nor can its directors be accused of not wanting to fly British, because the Corporation has on order 33 Britannias, 19 Comet IV's and 12 Viscounts, costing nearly £85 million, and will save $25 million by having its Boeing 707's equipped with Rolls-Royce Conway engines, instead of American turbojets.

In addition, B.O.A.C. and de Havilland are working together on the design of a new jet-liner for service with the Corporation in 1962. Known as the D.H.118, it will have a similar performance to the large U.S. jets, which means a range of up to 6,500 miles at 525–575 m.p.h., but will be somewhat smaller in size. As a result, it will be suitable not only for the Atlantic run, but also for the many other routes throughout the world where there is not the traffic to fill the larger aircraft, and where runways are not long and strong enough to take them.

DC-7C on Schedule

Meanwhile, B.O.A.C. have taken delivery of the first of their ten Douglas DC-7C air liners, and will open a non-stop London–New York service with them this month. Powered by four 3,400 h.p. Wright Turbo-compound piston engines, these aircraft can carry from 48 to more than 70 passengers, according to the interior layout, at a cruising speed of around 350 m.p.h., and have weather detection radar in their nose to enable pilots to avoid bad weather en route.

From April onwards, the DC-7C's will be used to extend the B.O.A.C. network across the United States, from New York to San Francisco, where they will link up with a Qantas trans-Pacific service to form a round-the-world Commonwealth air route.

Aircraft "Boss" at 16

When 16 year old Roger Bailey leaves school at the end of this term, he will start in business as the "boss" of a company known as Pioneer Aircraft Services, at Croydon Airport.

His staff, ranging in age from 17 to 30 and including a qualified aircraft mechanic, have already completed



Roger Bailey in the cockpit of the first Tiger Moth renovated by his company.

their first job—the renovation and overhaul of an elderly Tiger Moth. As can be seen from the lower illustration on the previous page, it looks very smart in its sky blue and white finish, with no sign of the drab khaki and green paint it wore when used for training wartime R.A.F. pilots. Its carefully-tuned engine also sounds like new, although it was built in 1932 and must be one of the oldest Gipsy Majors still flying.

As well as running his overhaul and repair business, Roger hopes to take up air racing in due course. He has had plenty of practice, because he started to fly at the age of eleven and puts in a few hours "dual" most week-ends, and in summer on as many evenings as homework and the weather will permit.

South Pole Landing

A U.S. Navy R4D (Dakota) carrying Rear-Admiral George F. Dufek and six members of the American "Deep Freeze" Antarctic Expedition, became the first aircraft ever to land at the South Pole on 31st October last. The men were the first to stand at "the bottom of the world" since Amundsen and Scott travelled there by dog-sled and ski 45 years ago.

The aircraft landed on hard, dry snow, while a U.S.A.F. Globemaster circled overhead. It stayed at the Pole for 49 minutes, during which the crew embedded in the snow a trail of flags and radar reflectors to guide future landing parties, and made a rocket-assisted take-off.

On the previous day, another U.S. aircraft had circled the Pole and dropped supplies and a weather-recording device which reports weather conditions automatically by radio. On all such flights, the aircraft have to climb above 16,000 ft., to clear the 15,000 ft. mountains that ring the Antarctic Plateau in which the Pole is situated.

Space Suit

The upper illustration shows what the well-dressed British pilot now wears for high-altitude flying. Although unrecognisable, the wearer is Wing Cdr. Walter Gibb, Bristol's Assistant Chief Test Pilot, and he has on the partial pressure-suit that he wore on 29th August 1955 when he set up the present height record of 65,890 ft. in a Canberra.

Made from nylon fabrics, the suit is tightly-fitting and so designed that it would be drawn close around the pilot's body if his aircraft pressurisation system failed, by inflation of the rubber tubing which runs down the legs and arms and across the shoulders.

The domed plastic helmet is of a new type, equipped with oxygen mask, microphone, earphones, a movable visor and a hinged mouthpiece so that the pilot can eat and drink whilst wearing it. The strong plastic shell protects the pilot's head in an emergency, and inflatable pads are fitted inside the helmet to prevent his face and neck from swelling when the pressure-suit is inflated.



Wing Commander Gibb, Bristol's Assistant Chief Test Pilot, wearing the latest high-altitude flying suit and helmet.

Delta-Wing Dragons

Illustrated below are two prototypes of the fine new Saab-35 single-seat jet fighter, which is in large-scale production for the Royal Swedish Air Force as the J-35 Draken (Dragon). Powered by a Swedish-built Rolls-Royce Avon turbojet, with reheat, it is designed to combine high supersonic speed with ability to take off and land on short runways.

Key to its efficiency is the unique "double-delta" wing, which was tested on the little Saab-210 research aircraft and with the aid of control-line models. Since the prototype flew for the first time on 25th October, 1955, three small fences have been fitted under each outer wing panel, and a small triangular fin, known as a vortex gate, has been mounted above the fuselage to improve control.



Two prototypes of the new Swedish single-seat jet fighter, the Saab-35. This aircraft is now in production for the Royal Swedish Air Force as the J-35 Draken.

Worlds that Vanished

By Leslie E. Wells

MANY explorers have been puzzled by cities they have found in the heart of Africa, for these cities seem to have been deserted suddenly by peoples who lived in them for hundreds of years. What happened to the people no one knows, for there is no sign that they were overthrown by enemies, nor is there anything to suggest that they were stricken by plague or famine.

These mysterious, deserted cities, however, are nothing in comparison with the worlds that lie beneath the seas and oceans of the Earth. For it appears that these amount to whole continents, covering thousands of square miles. It *is* possible to say what happened to them, for it is known that some vast areas of land sank beneath the waters, where they can be seen to this day. In fact, some of these lands are even now being explored by scientists.

One of these lost worlds is called Lemuria, and when it was dry land it was, so it is said, as large as the whole of North America, and might even have been much larger. When it was above water, Lemuria stretched from Madagascar, on the East African coast, to Sumatra and India. The scientists believe that this land existed for between five and six million years and then, about twelve thousand years ago, it was claimed by the sea.

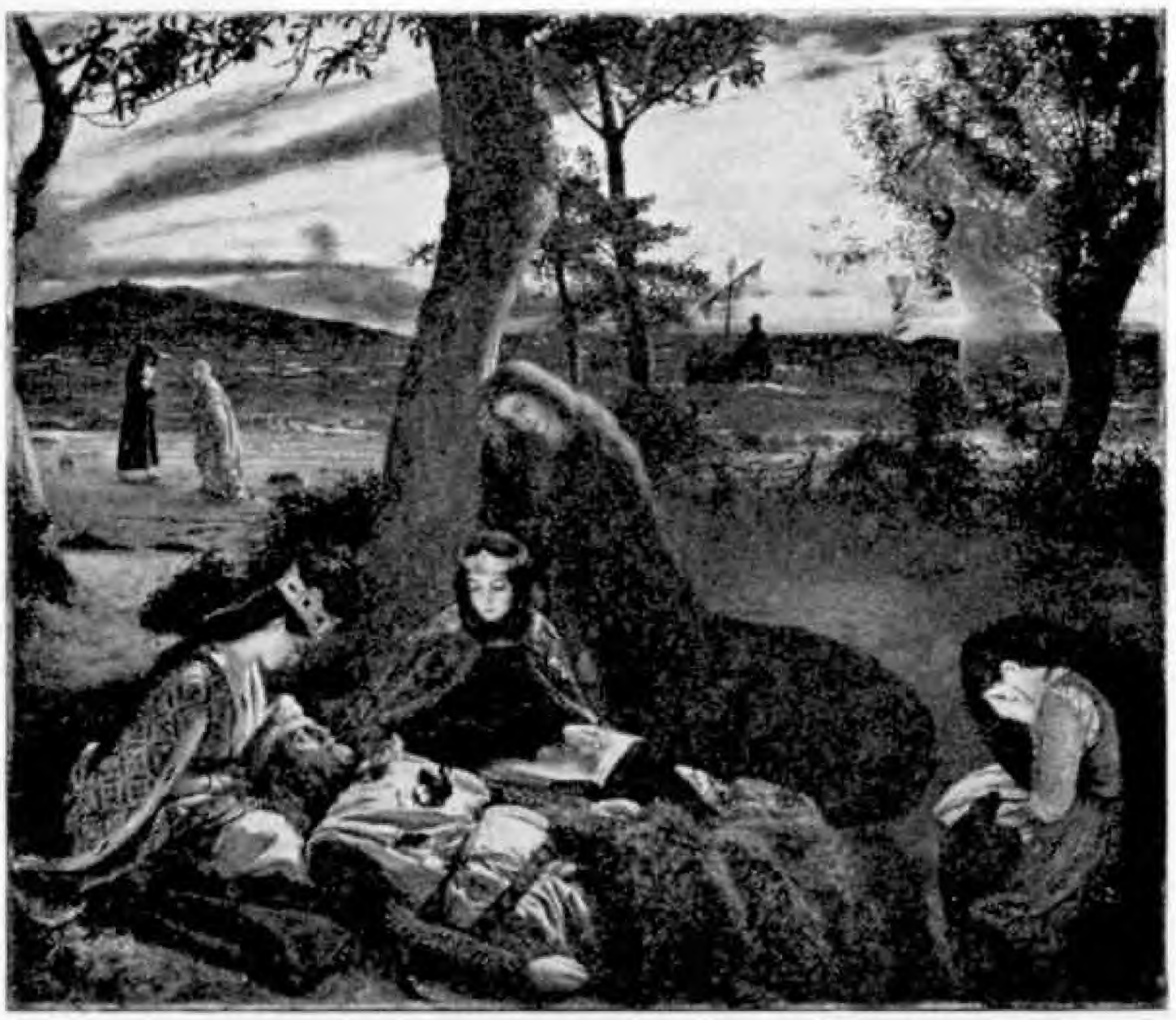
Many expeditions have set out to discover this lost world, and many have been disappointed. But a party of explorers, led by Colonel Seymour Sewell in 1933, met with a great measure of success. This team made a most careful survey of the Red Sea, the Gulf of Aden, the Arabian Sea and the Gulf of Oman. And they discovered traces of a large area of submerged land.

They also found that a deep valley ran under the water from the Indian coast towards Socotra. This, there is reason to think, was once a large river bed and may well have been the continuation of the great Indobrahm River, which at one time flowed across Northern India from east to west.

The team also came upon ten ranges of hills beneath the water, and two areas where there was little or no animal life on the sea bed. This suggests that these areas might be enclosed by hills that have prevented the creatures of the sea reaching them.

There are some people who believe that it was on this submerged stretch of territory that the first men appeared, and that it is therefore the "cradle of mankind." Be that as it may, it is certain that there are territories beneath the sea on which men have lived and on which they have built cities. Which means, of course, that there are underwater cities.

The ruins of one such city were discovered only ten years ago off the Crimean coast, in the Black Sea. It is thought that this city was inhabited until four hundred years



Did Lyonesse exist? The legends of this lost land between Cornwall and the Scilly Isles are associated with those of King Arthur and the Knights of the Round Table. The death of the famous British king is the subject of this painting by James Archer. Picture Post Library.

before the birth of Christ, and it was probably the victim of an earthquake. This caused the land to collapse, and the city was carried beneath the water. That this almost certainly happened is confirmed by the fact that such a disaster is mentioned by Greek historians.

This city, although many feet under the water, has been explored, mapped and measured. The sea was marked out into small areas, and divers went down in these sections to examine streets and ruined buildings where no human foot had trod for nearly 2,500 years. Using special cameras, they also took photographs.

This survey revealed that the city was about a mile in length and nearly a quarter of a mile wide. It was surrounded by about twenty towers, built, it is almost certain, to keep out invaders. The buildings are in such good condition that a model of the city is being made from the knowledge gained by those who explored and photographed it.

Metalimen is another city that now lies beneath the sea, and it is said that this is the richest city in the world. It was once part of the island of Ponape, in the Pacific, and is now submerged beneath a hundred feet of water. On a clear day, however, the streets and buildings of the city can be seen easily from overhead.

This city, like that of the Crimea, sank suddenly beneath the water, giving its inhabitants no chance to escape. Perhaps because of an earthquake, it went down in a matter of moments, taking everything and everyone with it.

That is why it is thought to be the richest city in the world. For the priests of Ponape claim that down in the sunken city are the treasures of an ancient empire that existed long before the Pacific Ocean was seen by white men. In one of the city's treasure houses, the priests say, rests untold wealth in the shape of large and exquisite pearls and emeralds, and masses of silver.

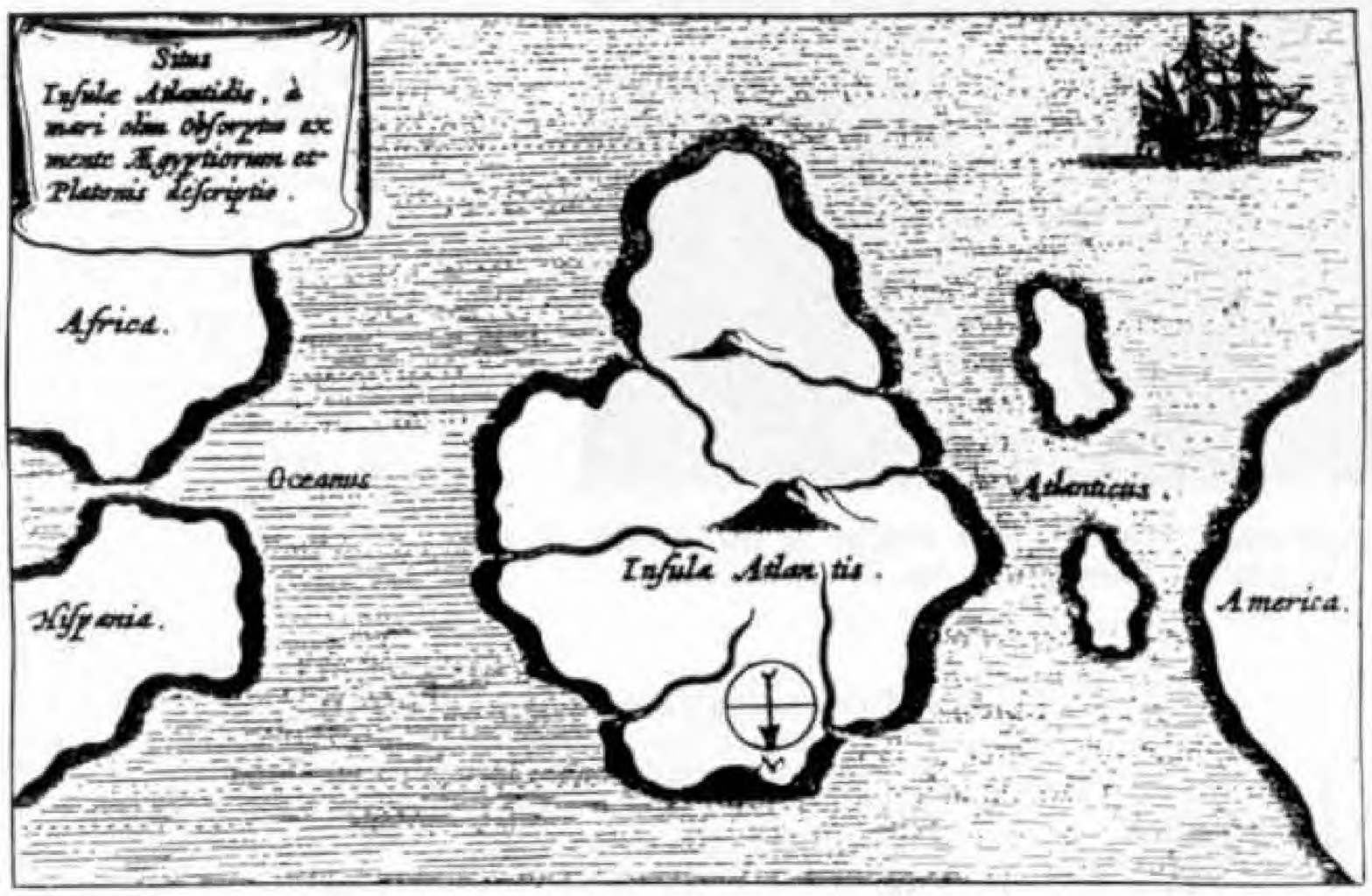
Down there, too, is the "House of the Dead", containing, it is believed, about 100,000 mummified bodies. These were the famous men of the empire, and each one was encased in an air-tight platinum coffin weighing about 40 pounds. So far, however, no one has succeeded in locating either the treasure house or the "House of the Dead".

It is claimed that the submerged land of Lyonesse stretched from Land's End to the Scilly Islands on the English coast. This was fertile country before it was submerged, being well wooded and containing no less than 140 churches. This, at least, is what legend claims for it, but there is some doubt as to whether Lyonesse had any real existence. History provides but little proof that there was such a piece of territory, but there is evidence that it was not merely imaginary.

William Camden, the well-known 16th century historian, was quite convinced that Lyonesse was a reality. In proof of this, he draws attention to the fact that windows and other parts of dwelling houses have been picked up by fishermen a few miles east of the Scilly Isles. In addition, large numbers of trees have been washed up in this area, and this suggests that the water hides land that was once covered by a forest.

It would seem, then, that Lyonesse really did exist, but it is harder to believe that King Arthur lost his life when the land vanished under the sea. The story goes that it was on this land that he fought Prince Mordred and his followers. The soldiers of King Arthur retreated, leaving him to die on the battlefield. They had barely reached high ground, which is thought to be St. Martin's Head, when

(Continued on page 50)



A map of Atlantis, from an engraving of 1665. Note that the map is the opposite way up to those of modern atlases. Picture Post Library.



The down "Queen of Scots" Pullman near Ardsley. The engine is No. 60134 Foxhunter, of the Peppercorn A1 class. Photograph by P. J. Sharpe.

Railway Notes

By R. A. H. Weight

Aboard the Queen of Scots

Among the fine series of Anglo-Scottish expresses running every weekday, the *Queen of Scots* is unique, as it is formed entirely of Pullman cars. It makes the long journey of 440 miles between London, King's Cross, and Glasgow, Queen Street, by way of Leeds, Harrogate, Newcastle and Edinburgh. One train leaves King's Cross at noon and its companion service running in the opposite direction leaves Edinburgh at the same time, having begun its southbound journey in Glasgow at 10.43 a.m.

I recently travelled northward from London most comfortably in the car *Phyllis*, when A1 4-6-2 No. 60120 *Kittiwake*, stationed and manned at Copley Hill shed, Leeds, gave a grand run with the advantage of clear signals all the way, though there were three slacks or slowings on account of track repair, drainage work, etc. The train consisted that day of five 1st and five 2nd class cars all well filled, two being detached at Leeds, where reversal takes place. With about 420 tons behind the tender, *Kittiwake* surmounted the rising grades out into the Hertfordshire hills well within time, and averaged 80 m.p.h. along the 27 miles between Hitchin and Huntingdon, which is nearly always a fast stretch. Peterborough, 76½ miles, was passed in 72 min., Doncaster, 156 miles, in 156½ min. Then diverging from the direct East Coast main route, which goes by way of York, on to the steeply graded West Riding line, Wakefield, 176 miles, was passed very cautiously as usual in exactly 3 hrs., the first stop at Leeds, Central, being reached at 3.17, 7 mins. early!

We had run nearly 186 miles in 197 mins. including about 5 min. lost by permanent way slowings. The few minutes added to the winter schedule to allow for delays as compared with last summer's timing were certainly not needed on this occasion.

In the interval for servicing the cars I went along to thank and congratulate the retiring driver and fireman, and to visit the bookstall and post-box. We restarted with one of the older Gresley A3 Pacifics, No. 60036 *Colombo*, from Neville Hill shed, Leeds, in charge of 8 cars, about 335 tons. Amid a network of tracks once belonging to several different companies we descended to the former Midland main line and then diverged on to the North Eastern, and so out past Headingley and up the 1 in 100 rise to Bramhope Tunnel, sustaining 38 m.p.h. at the top. This brought us into fine Yorkshire moorland scenery, and over the rather spectacular Crimple Viaduct, with its grand views and sharp curves, into the elevated spa town, Harrogate, reached punctually just after 4.0 p.m. We passed the sister express southbound, at 3.56.

Descending rapidly past the old-world city of Ripon, the *Queen of Scots* rejoins the main East Coast route at Northallerton, an important junction on the straight, high-speed stretch, with colour light signals; Darlington, the next stop. The run continues past impressive Durham and over the Tyne into Newcastle, where a fresh locomotive takes over for a fast 124-mile run to Edinburgh.

Locomotives in the News

Commencing with a variety of new motive power for announcement, and detailing steam additions first, Nos. 92088–90, class 9 2–10–0, went to 36A, Doncaster shed. Nos. 73132–4, class 5 4–6–0s, have been completed at Derby for the Western Region; Nos. 73130–2 with others of the series have been allocated to 84 G, Shrewsbury. Class 4 2–6–0s, built at Doncaster for the Scottish Region, included Nos. 76070–1, 66B shed, Motherwell, and Nos. 76072–3, 68B, Dumfries. No. 80144, another class 4 2–6–4T, was added to stock at 34E, Neasden. No. 3409, W.R. 0–6–0T, has emerged from the Yorkshire Engine Company's works.

Diesel-electric 0–6–0 shunting engines turned out from Derby include Nos. 13270–4 for the Southern Region, Nos. 13275–6, allocated to 65A, Eastfield, and No. 13277 to 65C, Parkhead. Both the last named depots are in Glasgow. Similar new N.E.R. locomotives are Nos. 13317 and 13321–2, to 52E, Percy Main, and Nos. 13318–20, to 50A, York. Of the diesel-mechanical 6-wheeled type for Eastern yards, Nos. 11179–81 were added to stock at 40A, Lincoln, Nos. 11161–2 at 32A, Norwich, and Nos. 11212–3 at 50b, Leeds, Neville Hill, N.E. Region.

W.R. 2–6–0s formerly numbered 9301 and 9317 have been altered respectively to Nos. 7323 and 7339, after modification resulting apparently in a reduction in weight. Pannier 0–6–0T No. 7711 has been transferred from W.R. to London Transport ownership. Another, No. 8402, has been sharing banking duties with L.M.R. tanks up the famous Lickey incline on the Midland Bristol-Birmingham main line.

As three of the modern A1 Pacifics have lately joined the stud of 8P express locomotives (for a long time all A4 type) stationed at King's Cross, E.R., they are taking some share in the haulage of Pullman, the *Talisman* and other important long-distance

expresses worked by that depot's engines and men. They also have part in operating the remarkable new express goods duty, 3.15 p.m. King's Cross to Newcastle, calling only at Skelton Sidings, York. The A1s transferred from Grantham to King's Cross are Nos. 60149 *Amadis*, 60156 *Great Central*, and 60157 *Great Eastern*.

Around Leeds and Southward by Midland

The main line from St. Pancras and Derby to Carlisle and Scotland passes through Leeds, and connects northward and southward with Bradford by means of the triangular junctions at Shipley. In addition to through services to Birmingham and the West of England from Bradford and Leeds, well provided fast trains also run from these cities to London, St. Pancras, though the distance is greater, and overall time longer than by the best King's Cross route E.R. expresses. The Midland trains serve important cities and towns on the way, however, including Sheffield and Nottingham or Leicester, where many people alight and join.



A pleasant Scottish station scene, showing 0-4-4T No. 55224 at Clarkston. Photograph by G. H. Robin.

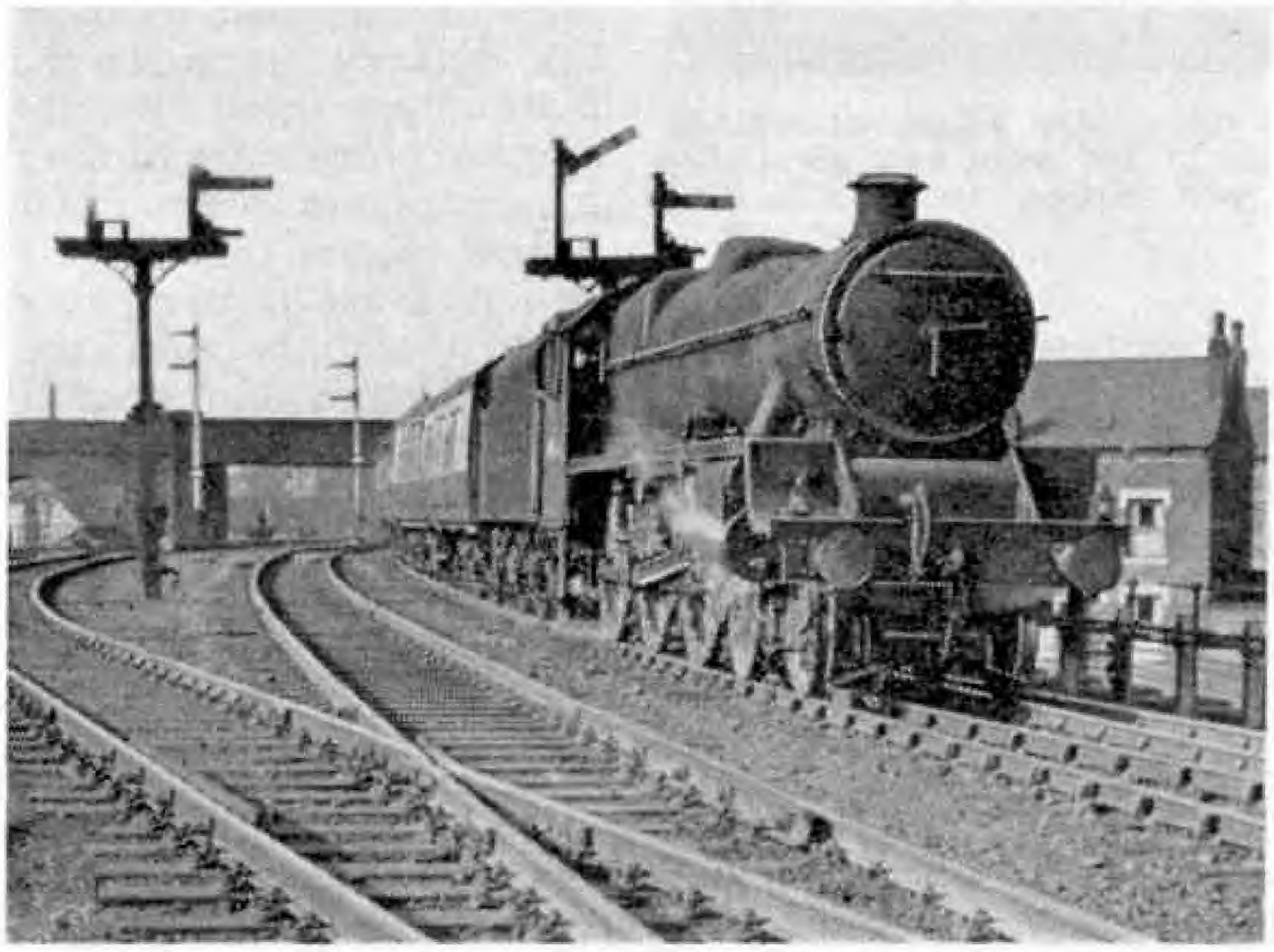
On a very showery day I left Bradford, Forster Square, in the 10.30 a.m. behind a class 5 4–6–0, calling at Shipley then travelling fast along the four-tracked 11-mile stretch into Leeds City station, with its imposing concourse and booking hall, where reversal takes place. Jubilee 3-cyl. 4–6–0 No. 45605 *Cyprus* came to work through to St. Pancras, with Kentish Town driver and fireman.

Noted at City stations, or on the adjacent and overhead lines as we moved out, were locomotives of the Great Northern J6, J50, and N1 classes, Lancashire and Yorkshire 2–4–2T, L.N.E.R. D49 "Hunt" and B1 4–6–0, North Eastern G5, Great Central C13 and a number of L.M.S. types.

One needs large scale maps to identify the many stations, railways, collieries and industrial installations passed on this journey through Yorkshire and the north Midlands, their use adding to its interest. We passed many freight and coal trains, one or two of which delayed us by signals, and there were several extra speed restrictions. Dining cars were attached in rear at Sheffield, making the load nine coaches weighing 310 tons tare, a little over the rostered 300-ton limit for the accelerated timing south of Nottingham.

We left Nottingham at 1.20 past Trent Bridge, uphill out into the country on the Melton Mowbray route. With speeds varying between 56 and 75 m.p.h. over the undulations, through a good many tunnels, and joining the main line via Leicester at Glendon Junction, Kettering, 51½ miles, was reached within a few seconds of the 55-min. booking.

This train's new start to stop schedule from Kettering to London, 72 miles in 71 min., is very tight, as the course is by no means easy. Rain at times was torrential. The moderately powered engine developed a slight steam leak. It was making a long run and was not provided with the best of coal. Minimum speeds at the tops of climbs were 48½ and 49½ m.p.h., and maxima downhill were 80½ before Bedford, and 77 near Mill Hill in the London suburbs. An engineering slowing through Luton spoiled one descent, though a fast finish was made. The last 20 miles in from St. Albans were run in 19 min., so the actual time to a dead stand in St. Pancras was 74 min. In the circumstances this was not at all a bad effort and we were only a few minutes late. Our time for the 123½ miles from Nottingham, including Kettering stop, had been 2 hr. 11 min.—less than some of the present non-stop allowances and quicker than any up to a few months ago.



The up "Thames Clyde Express" leaving Leeds for St. Pancras behind Jubilee 4-6-0 No. 45664 Nelson. Photograph by R. F. Roberts.

Plenty of New Rolling Stock

The Carriage Works of British Railways as well as those of private firms—the latter are also busy with locomotive and rolling stock orders from overseas—are much occupied in fulfilling the large scale orders for corridor coaches, refreshment cars and other vehicles of the latest and most attractive type for use in main line steam and electrically operated fast services, as well as for train sets of greater carrying capacity for suburban and local journeys.

Cameras in Space

By John W. R. Taylor

THE photographs on this and the next two pages are among the most remarkable ever taken, because they give glimpses of the Earth on which we live such as no man has ever seen with his own two eyes.

One was taken from a height of 158.4 miles above the ground. Another, made up of two separate photographs, taken at heights of 155 and 138 miles and mounted together, shows an area of 600,000 sq. miles, equivalent to about one-fifth of the entire area of the United States. The horizon is 1,085 miles away; the distance along it 1,036 miles; and if anyone disbelieves that the world is round, these photographs should put him right, because the curvature can be seen clearly.



This picture of the Earth was taken from the greatest height yet achieved by a camera. It is the view from a height of 158 miles over the United States, looking southward over the border with Mexico. Official U.S. Navy photograph.

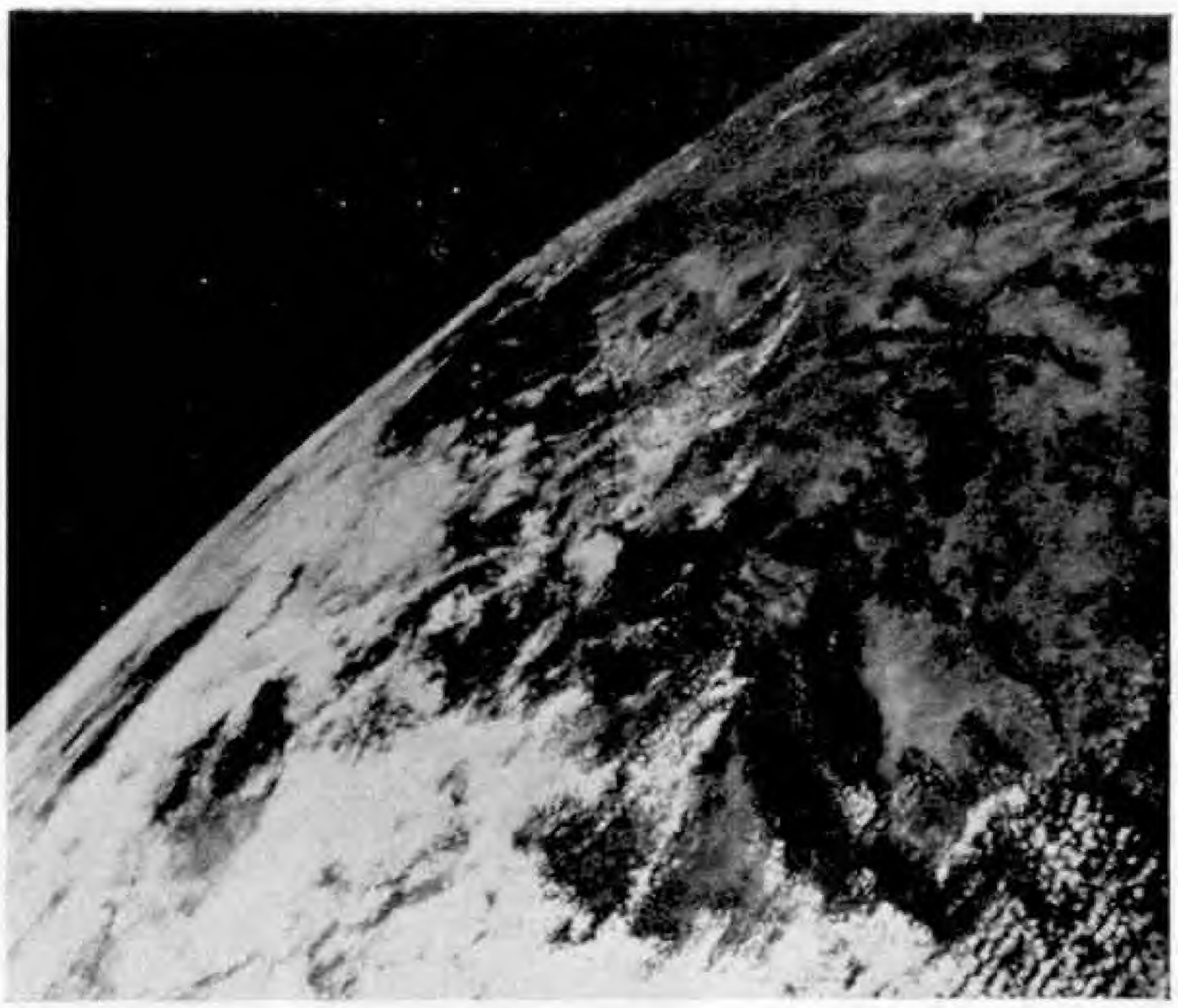
When these photographs are enlarged, all kinds of detail can be picked out. On one, the mighty Rio Grande river which forms the border between Mexico and the United States can be seen as a gossamer-like thread, bordered by cultivated land that stands out darkly against a vast background of desert. On another, a straight line, little wider than a hair, can be seen to change direction suddenly towards a dry lake bed ringed by mountains, identifying it as the Southern Pacific railroad heading for Tucson, Arizona.

The photographs bring geography to life, especially in their original form, for many are taken on colour film. They are also of great interest to meteorologists, because the tiny white spots near the ground are clouds, and, if the met. men were able to study such pictures taken at regular intervals each day, they would be able to give us almost infallible weather forecasts for a change.

In this respect, the lower picture on the next page which looks rather like the top half of a mouldy orange, contained a real surprise, because a large white area at the top left-hand side is nothing less than a great hurricane, its spiral tentacles embracing an area more than 1,000 miles in diameter.

It was the first time that a hurricane had been photographed from an altitude sufficient to show its entire structure. Normally, these deadly tropical storms are hunted by aeroplane, as described in the August 1956 *M.M.*, and it takes a very long time to photograph them, because the aircraft's height is little more than that of the clouds. Even worse, they sometimes escape detection, striking coastal areas and causing widespread death and destruction, without any warning.

Photographs taken by high-altitude rockets could change all this, by recording changing cloud formations. This was shown clearly by the example of this one hurricane that was photographed. Ground photographs and weather reports for the days that preceded the rocket firing showed that the storm was almost entirely a high-altitude disturbance at first. In fact,



The curved horizon in this picture shows our planet to be truly round. The photograph is a composite one, the two portions being taken from heights of 155 and 138 miles respectively. Official U.S. Navy photograph.

the surface winds were easterly and of low strength during the time that the storm was growing into a monster overhead.

Unfortunately, it will be a long time before the met. men get their regular rocket photo service, because Viking rockets of the kind that took the 158-mile photograph cost around £143,000 each. The Aerobee that took the hurricane's portrait was considerably less costly, but still more than a weather service can afford.

The rocket engineers and scientists who put the cameras into these research rockets had motives other than to help the weather men. By taking cine-films throughout each flight and knowing the precise time each picture was taken they were able to work out the direction in which the rocket's nose was pointing at any moment. Without this information, it would have been impossible to interpret accurately the stream of data on such things as cosmic radiation radioed back automatically by the rocket as it climbed, spun and tumbled in space. They did, however, make room for special photo-reconnaissance type cameras in the larger rockets, side-by-side with smaller cine-cameras, to obtain meteorological data.

So much for why the photographs were taken. Now let us see how they were taken.

In the case of the Aerobee, all filming was done with 16 mm. cine-cameras, because it was a comparatively small rocket and could carry only 170 lb. of instruments to an altitude of 100 miles. Normally, one of these cameras contained black and white film and the other coloured film. Thus, the "hurricane" photograph is actually made up of 310 separate pictures taken by the colour film camera, at the rate of six pictures per sec. with an exposure of 1/500 sec. at f3.5, using a semi-telephoto lens. The curved shape does not represent the curvature of the Earth, but the shape of the area covered by the prints.

In the larger

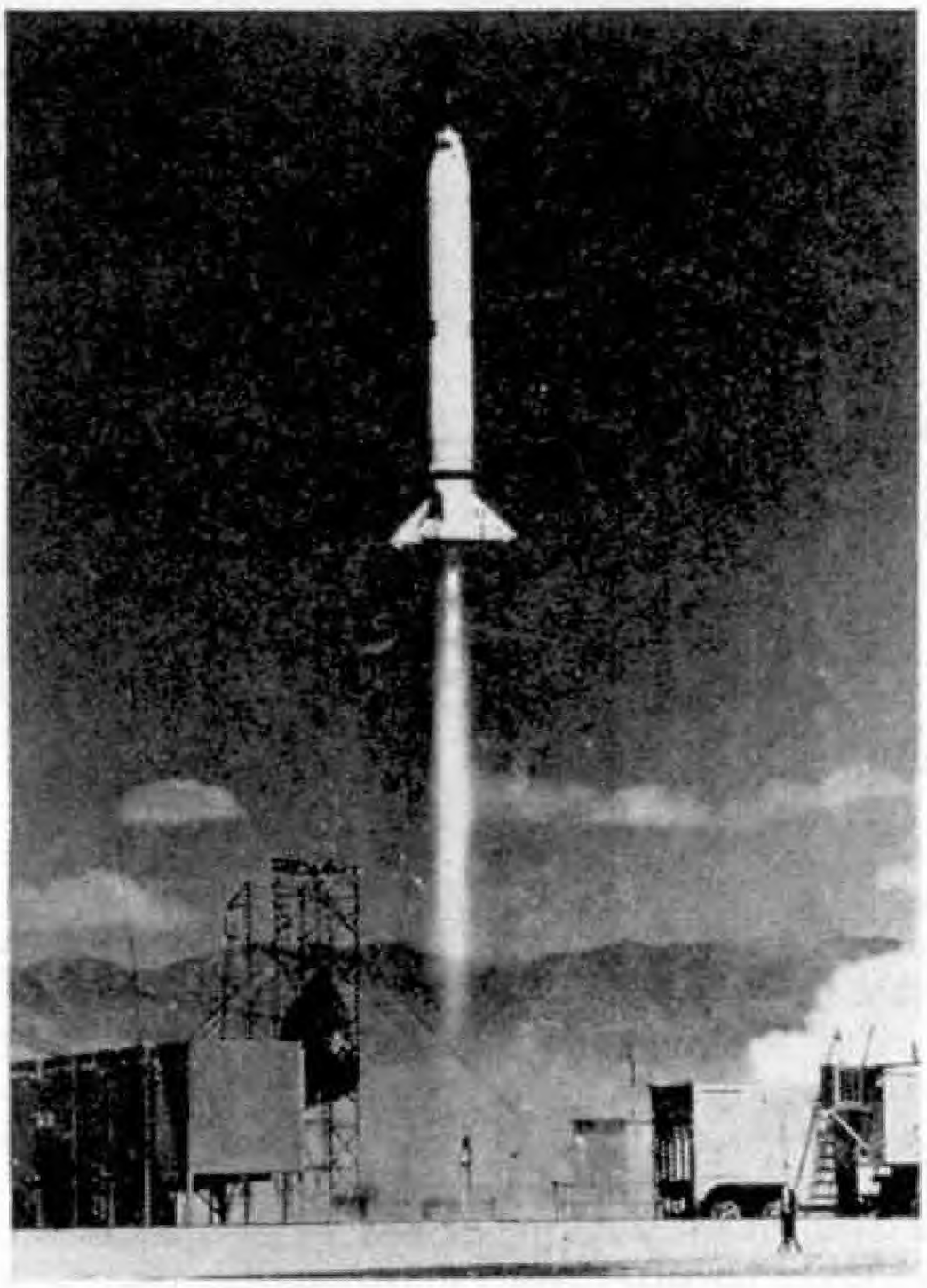


This is what you would see from a rocket about 100 miles up. About a million and a quarter square miles of the world's surface are shown in this composite view, made up of 310 prints from a motion picture film shot from an Aerobee Rocket. Official U.S. Navy photograph.

Viking, 16 mm. cameras were used to keep track of the rocket's manœuvring in space, while the very high-altitude pictures on pages 18 and 19 were taken with a K-25 reconnaissance camera, which produces 4 in. by 5 in. negatives.

The big problem was to find a way of photographing the ground during the rocket's ascent, without mounting the camera on the outside, which was impossible. Finally, it was decided to mount the camera in the instrument bay, about 12 ft. from the nose, pointing outward and slightly forward, and with a prism fixed by its lens in such a way that it would photograph the Earth almost vertically below.

All was ready to test this new arrangement in Viking No. 11 on 24th May, 1954, at the U.S. Navy's White Sands Proving Ground in New Mexico. The atmosphere was even more tense than usual, because everyone remembered Viking No. 10, the motor of which had exploded during the first launching attempt. Would the same thing happen to number eleven?



This Navy Viking 11 rocket, here seen being fired from the White Sands Proving Ground, New Mexico, made the record-breaking climb to a height of 158 miles above the Earth on which the photograph on page 18 was taken. Official U.S. Navy photograph.

The launching site was strangely deserted. For days, men had swarmed around the rocket on a huge gantry crane, servicing and adjusting the engine and instruments. Now, the gantry had been moved 100 ft. away. The 42 ft. long Viking, gleaming white in the strong sunlight, stood alone and apparently lifeless on its small tailfins; but beneath its metal shell more than 2½ tons of liquid oxygen, a similar weight of alcohol and 385 lb. of hydrogen peroxide awaited only the opening of a few valves to erupt into fantastic power.

Inside a concrete blockhouse with 10 ft. walls and a 27 ft. thick roof, men watched through heavy windows of thick glass, or stood by the radar scanners that would keep track of the rocket as it streaked skyward at more than 4,000 m.p.h. Holding their breath, they heard the loudspeaker ticking off the last few seconds—"Seven . . .six . . . five . . . four . . . three . . . two . . . one . . . FIRE!"

In a fraction of a second, the world seemed to tear asunder. Orange flames cradled in great clouds of billowing steam smashed down from the tail of the Viking, filling the desert air with waves of thunder that made the very ground shake. Slowly, so slowly that it seemed the rocket must topple, it began lifting from its concrete pad. The thunder increased and now the diamond shock waves could be seen in the exhaust as it started reaching for the sky, trailing flame.

It began to accelerate, faster and faster, looking like a white arrow with an orange tail that diminished to a tiny gleaming speck and then was gone.

After 104.7 sec., at a height of 37 miles, the motor died, its fuel burned, but the empty shell coasted on at tremendous speed. A carefully-designed stabilisation system reduced pitch and roll to a few degrees. After 124 sec., at about 55 miles, the electrically-operated K-25 began taking its pictures, one every ten seconds.

Then, 331.8 sec. after firing, steam-controlled jets were turned on in the body of the rocket. It started to rotate slowly so that, 19 sec. later, when the time came for the nose to separate from the afterbody, it was pointing towards the ground, more than 150 miles below. Still the camera continued its job, taking photographs for a total of 312 sec., by which time the afterbody had tumbled to about 113 miles on the way down. Some photos taken at about this time showed the nose-cap falling away

(Continued on page 34)

MECCANO MAGAZINE



Robert A. Soper can name any one of his Dinky Toys when it is shaken behind his back.

Junior Section

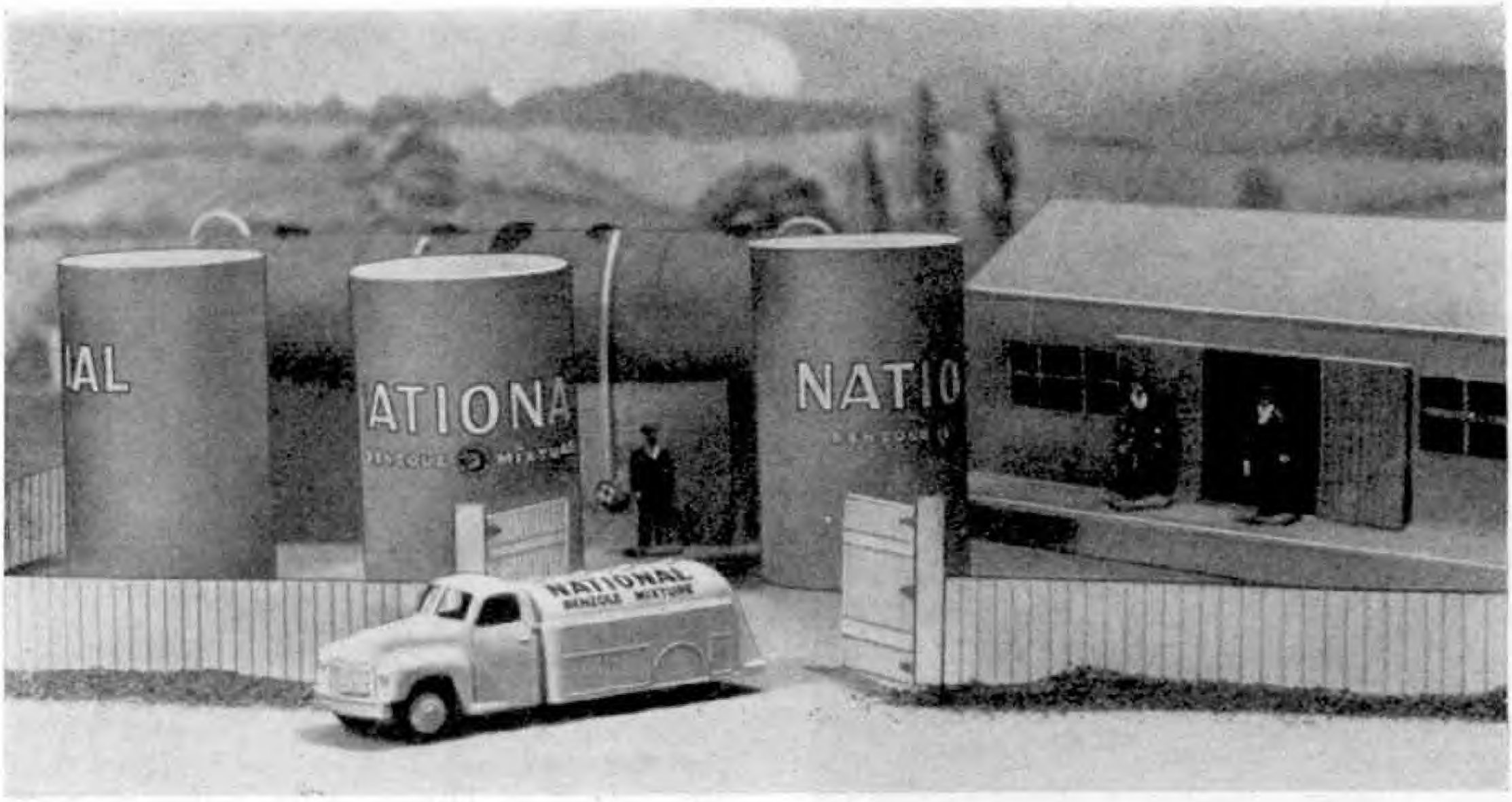
ROBERT ANTHONY SOPER, who lives in Wallington, Surrey, is one of the most remarkable Dinky Toys owners I have yet encountered. He is only four years old, but during the last two years he has acquired a large collection of Dinky Toys. Nothing very remarkable in that, you may say. But if anyone picks one of his Dinky Toys and shakes it, he will immediately say which it is, without looking at it.

I have tried to distinguish between different Dinky Toys myself by shaking them and listening, but I have not yet found the secret. Some of you may be more successful, and perhaps some day we may even hear of a set of Dinky Toys on which one can play tunes. I cannot imagine that the range of Dinky Toys notes is wide enough for that, however, and all I can do is to marvel at Robert Soper's extraordinary capacity to recognise any one by the noise it makes when shaken.

Once more I come back to the question of road safety, this time with a picture showing P. C. Denton, Braintree, Road Safety Officer of the Essex Police, giving a talk on this subject to a group of American children at the U.S.A.F. base at Wethersfield. As is so often the case, P. C. Denton, who is accompanied by P. C. Horne, also a Road Safety Officer, is making good use of Dinky Toys on his layout board to illustrate what all of us should know in order to keep down the number of accidents.



P. C. Denton, Braintree, uses Dinky Toys in Road Safety demonstrations. Here he is seen talking on road safety to American children at a U.S.A.F. camp in Essex.



DINKY NEWS

By **THE TOYMAN**

"National Benzole" Tanker

TO me one of the best features of the Dinky Toys collecting hobby is the endless scope it provides for variety in games and play schemes. No matter in what direction your interests lie, there are sure to be Dinky Toys or Dinky Supertoys that will provide you with hours of real fun and pleasure.

As you know, new models are added regularly and the point about the variety of the models in the range was brought to my mind when I looked over a list of the items introduced last year. These include aeroplanes, sports and saloon cars, lorries, army vehicles, the B.O.A.C. Coach and of course the popular Caravan. I expect most of you will have added these models to your collections and, like me, you are looking forward eagerly to the models that will become available this year. I can assure you that many exciting new models are being prepared and I will give you details of these as soon as they are added to the range.

For a start I would like to draw your attention to the attractive model shown in the pictures on these pages. This item is one that can be used in many exciting games and play schemes. The actual vehicle is an old established favourite, and now, in its new colour scheme, and with new transfers, it is sure to attract widespread attention. The Dinky Toys "National Benzole" Tanker, No. 443, is brightly finished in yellow, and the name "National Benzole Mixture" appears in black along the sides, while the familiar sign in colour is applied to the back of the body. The result is that the Tanker is particularly attractive, as you will see from the picture in colour on the back cover of this issue. I am sure the "National Benzole" Tanker will prove a very popular addition to the range.

The easy-to-make fuel depot seen above provides a realistic setting for the "National Benzole" Tanker.

I wonder how many collectors have tried adding an oil and petrol storage depot to their layouts. Most of the pictures sent to me by the owners of layouts feature at least one miniature garage, as practically every collector likes to run his vehicles into a garage or service station to fill up with fuel. The supply of fuel to the garages seems to be a point that is overlooked, however, and this is somewhat surprising in view of the splendid range of tank vehicles in the Dinky Toys series. After all, these tankers

must fill their tanks in order to deliver petrol or oil to the garages, and a fuel depot is therefore a logical addition to the facilities of a Dinky Toys town.

In real life the refining plants of oil companies are huge affairs, with intricate networks of tanks and pipes that cover a lot of space. This is much too complicated for the average layout, although if you have plenty of space and the skill necessary to make the buildings and equipment it would make an attractive showpiece for your layout! Most collectors, however, have to be content with less ambitious schemes, and for them a simple storage depot is much more convenient. The depot I arranged was designed to fit into an odd corner of a layout, and it proved very easy to make and to set out. For the storage tanks I rolled lengths of cardboard into tubes and fitted them with ends glued in place.

These tanks, together with a simple building for the staff, I arranged in the space I had available. A gate and a few lengths of fencing completed the scene you can see in one of my pictures, which makes an appropriate setting for the "National Benzole" Tanker.

Having a definite purpose for operating Dinky Toys makes a tremendous difference to the fun and pleasure obtained from the models, and I strongly advise collectors to make a layout if it is at all possible. It need not be a large layout, in fact it is surprising what an attractive scene can be arranged in a very small space. Even a few simple buildings will make possible the operation of many interesting play schemes, for they provide a definite reason for the journeys made by Dinky Toys vehicles. This is much more satisfactory than carrying out haphazard schemes with no definite plan in mind.

The oil depot I have described is a good example of the way in which a simple addition to a layout can extend the scope of operations. With this depot and a garage you can arrange a complete fuel distribution system in miniature, with tankers to carry the fuel to the garage ready for sale to the inhabitants of the town. I feel sure that those of you who have not yet tried making such a layout will find plenty of fun in building the scene and will derive much more pleasure from operating your models after the layout is built.

Don't think that it is difficult to make suitable buildings. Indeed this is quite a pleasant means of whiling away the long winter evenings. Cardboard and other odds and ends of materials found around the house can be put to good use in making them, and painting them should be within the capacity of most collectors. If you have any doubts of your ability to design your own buildings, however, or if time is short, there are a number of firms who produce printed sheets for making miniature buildings of various kinds. These buildings are produced for use by model-railway enthusiasts in lineside effects, but most are equally suitable for Dinky Toys scenes. The printed sheets are reasonably priced and it is quite easy to cut out the various sections and put them together. They are readily available from most hobby shops and handicraft dealers.

So try your hand at constructing a layout for your Dinky Toys, and let me know the result of your efforts, with pictures if possible. Even a small layout is well worth while and I shall be interested to receive details of your own particular scheme.



The "National Benzole" Tanker, Dinky Toys No. 443, makes a splendid addition to the range of tank vehicles.

Easy Model-Building

Spanner's Special Section for Juniors

Ancient Military Catapult—Helicopter

THIS simple little model represents a war machine of a kind used by armies many years before guns were invented. They were designed to hurl large stones or other suitable missiles to break down defences. These ancient engines of war as they were known were of several types and that represented by our model consisted of a long wooden arm at the outer end of which was a sling to carry the missile. The arm was pivoted so that it could be pulled backward by means of ropes and a winding drum. When the arm was released it sprang forward at great speed hurling the missile with considerable force at its target. The Meccano model will work successfully with small objects about the size of Washers or Bolts.

To make the Catapult first bolt a $5\frac{1}{2}$" Strip 1 to an end flange of a $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plate. This Strip forms the spring arm that throws the missiles, so it must be fixed tightly in place. To make sure that it will not twist to one side bolt a $2\frac{1}{2}$" Strip 2 to it and connect this Strip to the Flanged Plate by means of two Fishplates. Bolt two Angle Brackets to the upper end of Strip 1 as shown in Fig. 1 to make a small box in which to place the missiles.

Bolt two Trunnions 3 to the Flanged Plate and mount in them a Crank Handle 4. Use two Spring Clips to hold the Crank Handle in place. Now you need a short length of cord. Tie one end of this to the Strip 1 and fasten the other end tightly to the Crank Handle. To complete the model you should fix two 1" Pulleys on a $3\frac{1}{2}$" Rod passed through the side flanges of the Flanged Plate, and bolt a $5\frac{1}{2}$" Strip 5 to the Flanged Plate as shown. A $2\frac{1}{2}$" Strip fixed to the Strip 5 represents a towing handle and can be used for moving the Catapult from place to place.

To operate the model you should place a Bolt or any other suitable object in the box at the upper end of Strip 1, then turn the Crank Handle to wind in the cord so that the Strip 1 is bent backward. When the Crank Handle is released the springiness of the Strip 1 will cause it to fly forward and the missile in the box will be ejected.

Parts required to build the Military Catapult: 2 of No. 2; 2 of No. 5; 2 of No. 10; 2 of No. 12; 1 of No. 16; 1 of No. 19s; 2 of No. 22; 2 of No. 35; 14 of No. 37a; 14 of No. 37b; 2 of No. 38; 1 of No. 52; 2 of No. 126.

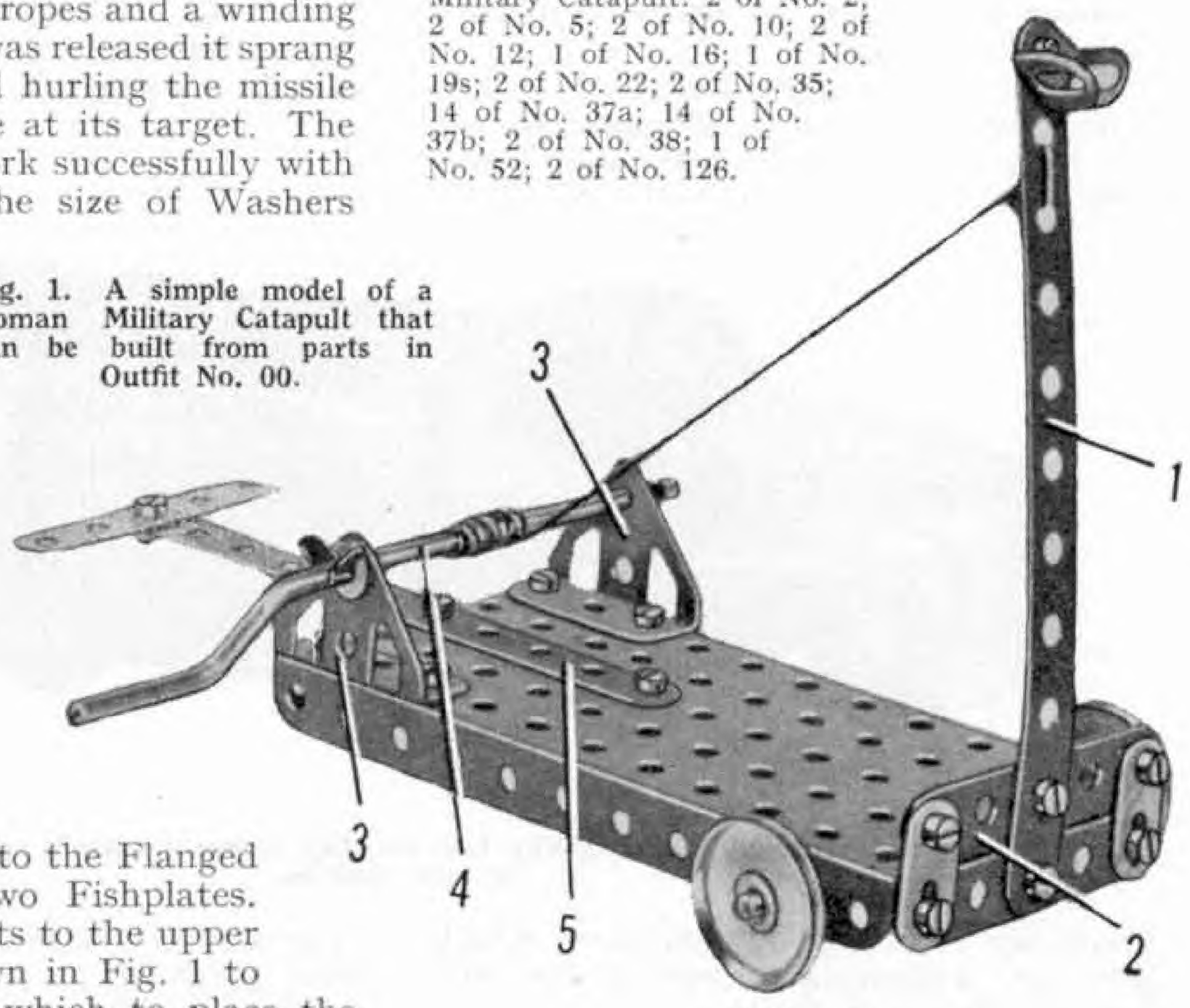


Fig. 1. A simple model of a Roman Military Catapult that can be built from parts in Outfit No. 00.

Helicopter

In contrast to the Military Catapult the second model I have designed for you this month is based on a subject that is thoroughly up to date. The Helicopter illustrated in Figs. 2 and 3 represents a general purpose type of machine designed to carry three or four passengers. This type of helicopter is used by both civil and military authorities for many kinds of duties, including rescue, search, observation and ambulance work. The model is very easy to make yet it is strikingly realistic in appearance. Actually all the parts required to build the Helicopter are



Fig. 2. Outfit No. 3 contains all the parts required to build this model Helicopter.

included in a No. 3 Outfit, and the model makes an excellent subject for the owner of one of these Outfits or one larger.

Each side of the fuselage of this model is formed by a $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate 1 extended towards the tail by a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Triangular Flexible Plate 2. The front ends of the Plates 1 should be curved and bolted together as shown, the bolts being used also to support a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip 3. The next step is to bend two $4\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates 4 to U-shape, and fix them to the Plates 1 and 2. A $5\frac{1}{2}''$ Strip 5 should be fixed to the Plates 4 and to the top of Double Angle Strip 3, and two Formed Slotted Strips should be bolted as shown to Strip 5.

To make the tail of the model a $5\frac{1}{2}''$ Strip 6 is attached to each side as shown, and to these Strips are fixed two U-section Curved Plates. A $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate 7 is bolted in place on each side. The rear ends of the Strips 6 are connected by a Double Bracket, the bolts used to secure this being used also to support two Fishplates. A 2" Rod mounted in the Fishplates is fitted with a Spring Clip and a Rod and Strip Connector. A $2\frac{1}{2}''$ Strip bolted to the Rod and Strip Connector represents the tail rotor of the Helicopter.

The floor of the cabin can be made with two Semi-Circular Plates bolted together as shown in Fig. 3 and attached to $\frac{1}{2}''$ Reversed Angle Brackets 8 fixed to the sides. The pilot's seat is made from a Trunnion and a Flat Trunnion fixed together, and these also are connected to the sides by Angle Brackets.

To make the support for the main rotor a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Triangular Flexible Plate 9 is bolted to each side, and the upper ends of these Plates are connected by a Double Bracket. A 2" Rod is mounted in the Double Bracket and in the Strip 5, and is fitted with a Spring Clip and a Bush Wheel. Three Fishplates are bolted to the Bush Wheel, and these support three $5\frac{1}{2}''$ Strips that form the vanes of the rotor.

The main landing wheels are fixed on $\frac{3}{8}''$ Bolts passed through Angle Brackets, which are bolted to two $2\frac{1}{2}''$ Strips on each side. One of these Strips is fixed to the $\frac{1}{2}''$ Reversed Angle Bracket 8, and the other is bolted to an Angle Bracket. The nose wheel is a 1" Pulley on a $1\frac{1}{2}''$ Rod that is held in a Stepped Bent Strip by Spring Clips. The Stepped Bent Strip is bolted to the lower lug of the Double Angle Strip 3.

Parts required to build the Helicopter: 6 of No. 2; 5 of No. 5; 5 of No. 10; 2 of No. 11; 6 of No. 12; 2 of No. 17; 1 of No. 18a; 3 of No. 22; 1 of No. 24; 4 of No. 35; 48 of No. 37a; 48 of No. 37b; 1 of No. 38; 1 of No. 44; 1 of No. 48a; 2 of No. 111c; 2 of No. 125; 1 of No. 126; 1 of No. 126a; 2 of No. 155; 2 of No. 188; 2 of No. 189; 2 of No. 191; 2 of No. 199; 1 of No. 212; 2 of No. 214; 2 of No. 215; 4 of No. 221.

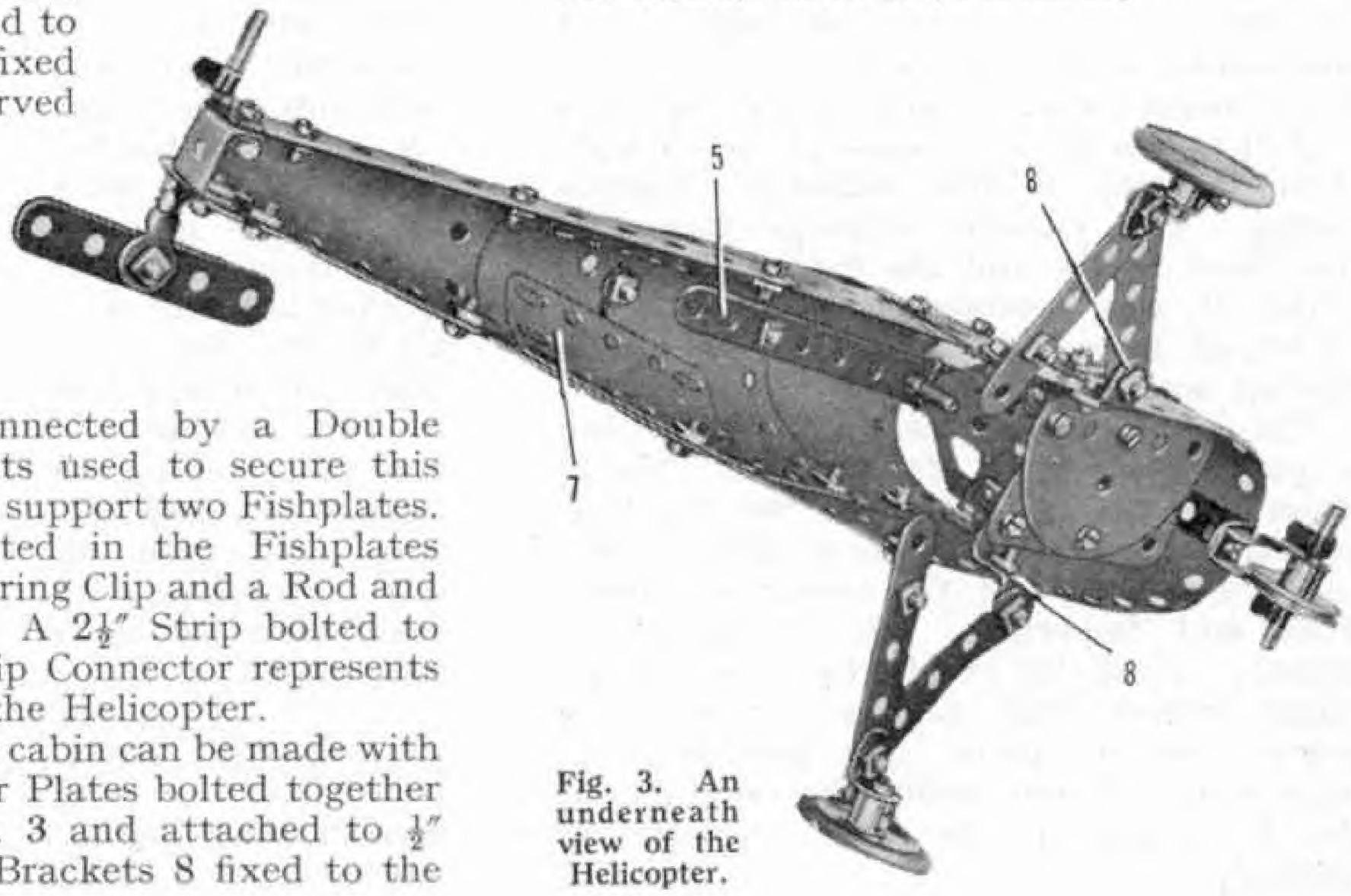


Fig. 3. An underneath view of the Helicopter.



Members of the Dinky Toys Club are entitled to wear this badge

ANNOUN

THE DINKY T

FOUNDER AND PRESIDENT:

Dinky Toys today are part of modern life. In view of the delight have been repeated demands for the creation of an organisation that will do Company have done, and are still doing, for those interested in model- Now the time has come when these wishes can be gratified, and a ne Roland G. Hornby, Chairman of Meccano Ltd., who is its President.

SO TODAY, 1st JANUARY, 1957, SEES THE BIRTH OF THE DINKY WORLD-FAMOUS TOYS. Any Dinky Toys and Supertoys enthusiast can be Dinky Toys Club, Binns Road, Liverpool 13, declaring that he is the Postal Order for 1/– with his letter, when he will be immediately enrolled

To mark his election as a member of the Club, the Dinky Toys Membership. The Badge is beautifully enamelled in red and white, with its centre is a fine representation of the steering wheel of a car, also in and orange, and carries the name of the member and that of the place in

EVERY boy knows the Meccano Guild and the Hornby Railway Company. The first of these was founded in 1918, and at once united Meccano boys in a great brotherhood, with members in almost every country in the world, all resolved to live up to the aims that the Guild set before them.

The second great organisation followed in 1928. By that time Hornby Trains had become as famous as Meccano, and thousands upon thousands of Hornby Train owners were looking eagerly for ways of getting the greatest amount of fun from their interest in the miniature railway hobby. The Hornby Railway Company met their needs, and the enthusiasm with which it was received was very largely increased later, when the Hornby-Dublo system was introduced.

The foundation of the Dinky Toys Club is yet another great step forward. Today there is scarcely a boy in the English-speaking world, and indeed in almost every country, who is not the owner of Dinky Toys and Supertoys. All of these look eagerly month by month for news of the latest introduction to the series. Now every one of them can heighten his enjoyment of his hobby by writing to the Secretary of the new organisation regularly.

A member indeed can derive a double benefit from his connection with the Dinky Toys Club and his correspondence with Headquarters. In the first place he will be able to exchange news and views with the Club experts, who will help him to get more fun from his hobby. In the second place he will be able to write directly to the Secretary of the Club to tell him what he would like to see included in the Dinky Toys or Supertoys range. He can also pass on any good ideas he may have for ways and means of using Dinky Toys, or playing with them, particularly in road layouts, the variety and interest of which



UNCING

TOYS CLUB

T: ROLAND G. HORNBY



The Dinky Toys Club Badge is beautifully enamelled in colour

ht and enthusiasm which they arouse, it is not surprising that there do for their owners what the Meccano Guild and the Hornby Railway el-building and in the construction and running of miniature railways. rew organisation to accomplish this has therefore been created by Mr.

Y TOYS CLUB, OPEN TO EVERY OWNER AND ADMIRER OF THESE become a member. All that he has to do is to write to the Secretary, ie owner of one or more of these famous miniatures, and enclosing a led.

s Club Badge is sent to every applicant, together with a Certificate of th the lettering "Dinky Toys Club" in gilt round its circumference. In in gilt. The Certificate of Membership too is a handsome one in black in which he lives.



are endless. These will be brought to the notice of other members through the Club and through its organ, the *Meccano Magazine*, a special section of which is devoted to Dinky Toys and Supertoys.

In this way the Club will give each member opportunities of helping others to derive more and more pleasure from their hobby. This indeed will be in the ruling spirit of the Dinky Toys Club, the members of which will vie with each other in efforts to increase the enjoyment of all.

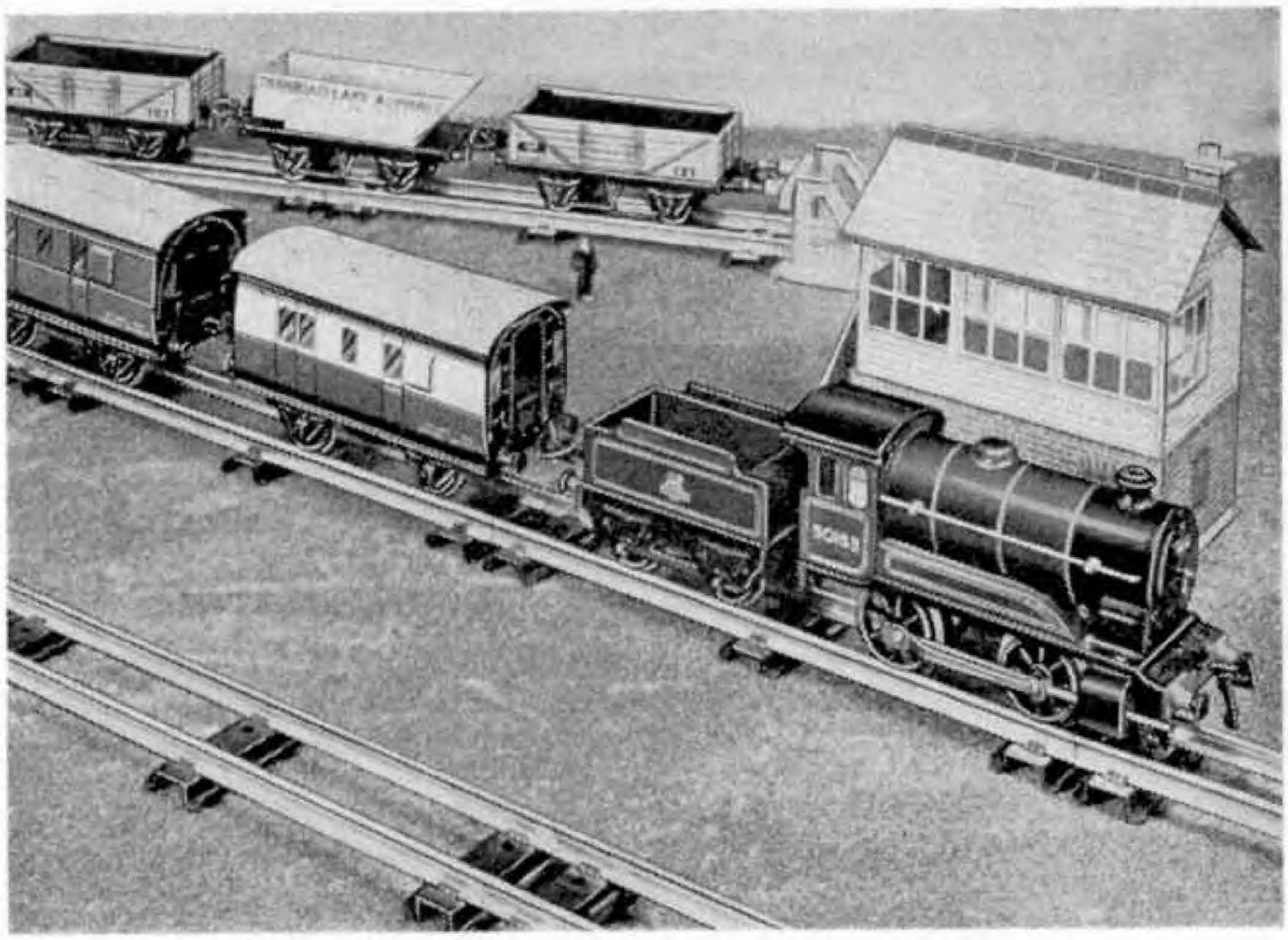
In accordance with the true spirit of the Club, every member should wear his Badge regularly, so that he and other members of the Club can recognise each other as Dinky Toys enthusiasts when they meet. With this in mind the Badge has been designed to be easily worn. Like the corresponding Meccano Guild and H.R.C. Badges, it can be slipped easily into the lapel buttonhole of its owner, and for those who are unable to do this there are brooch type Badges, fastening with a safety pin.

On meeting another enthusiast wearing the Badge, a member can compare notes with him, and the two will be able to tell each other what Dinky Toys they have, how they display them and, above all, how they use them in their playing hours.

From such a meeting of two enthusiasts it is but a step to the formation, with other members, of small local clubs, on the lines of the Meccano Clubs associated with the Meccano Guild and the Branches of the Hornby Railway Company.

Members of local Dinky Toys Clubs can combine their resources to build large road layouts on which to run their Dinky Toys and Supertoys cars and lorries, and to construct suitable scenic displays on which to use other miniatures included in the Dinky Toys and Supertoys series. The best of these will be described and illustrated in the Dinky Toys pages of the *Meccano Magazine*.

"Tommy Dodd" writes about



Mixed Traffic in Gauge 0

In the picture above a Hornby No. 51 Locomotive is heading a mixed train including the No. 41 and No. 51 Passenger Brake Vans.

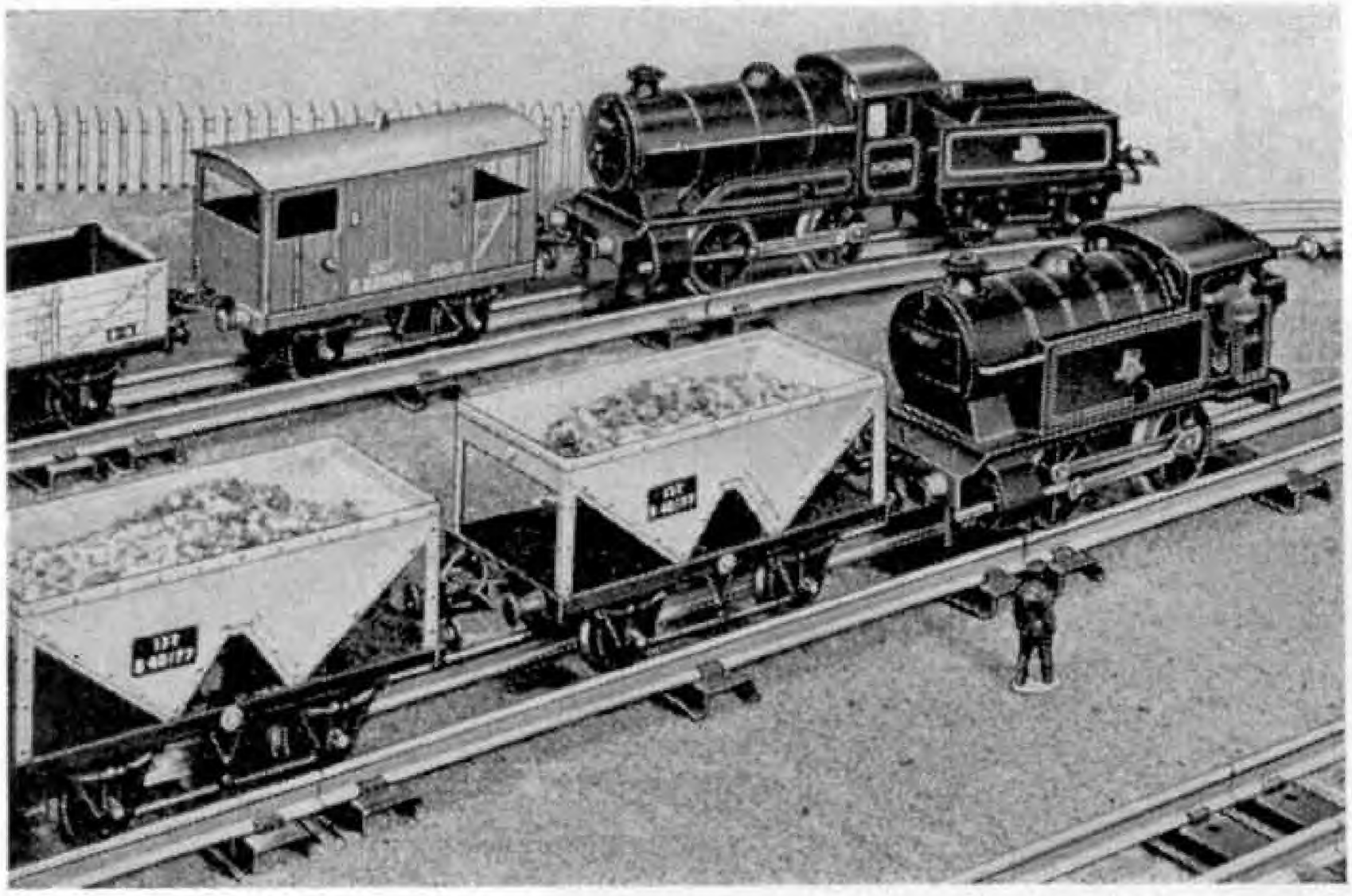
I EXPECT all of you know that a mixed traffic engine is one that can be used equally well on passenger or freight trains. I am using the term "mixed traffic" in our title above to refer to variations in train running that make for interest on even the smallest layouts.

Most of you begin with the passenger train or the goods train that is contained in your first Train Set, and when the railway has been made a bit bigger you add further Coaches or Wagons in order to increase the fun. I am sure you watch pretty keenly the working of real trains, and the way in which some of these are made up suggests schemes that can be made use of in miniature.

Probably in your station or lineside train watching you have often seen a train consisting of a number of vans, not just goods vans, but those of what we may call passenger type because they can be seen in passenger trains as well. For the most part these are built like coaches. These trains are run for parcels traffic and similar purposes. Sometimes they are quite heavy, and they may spend a long time at stations.

Here then is a new type of train to try on your railway. The picture above shows part of one, the first two vehicles being respectively the Nos. 51 and 41 Passenger Brake Vans. These are just the thing for trains of this kind, but there is no reason why you should not add one of the ordinary Goods Vans, or even a Milk Traffic Van, to give a more varied make-up. The sliding doors on these two latter vans will permit of actual loads being carried, if you like to do this sort of thing. A small but important point is that in whatever order the vehicles mentioned are assembled to form your train, you can always place the tail lamp correctly on the last vehicle. The correct "lamping" of trains helps the fun and realism.

For hauling a train of this kind, Locomotive No. 50, as shown in our picture, or No. 51—the black one—will do very well, but for short distance work the No. 40 Tank will be found quite effective. Parcels and similar traffic is always heavy at this time of the year and even if the real Christmas rush is over there is no reason why you should not let it continue a little longer on your own railway. That is where the Hornby railwayman has a big advantage. He can alter traffic conditions to please himself!



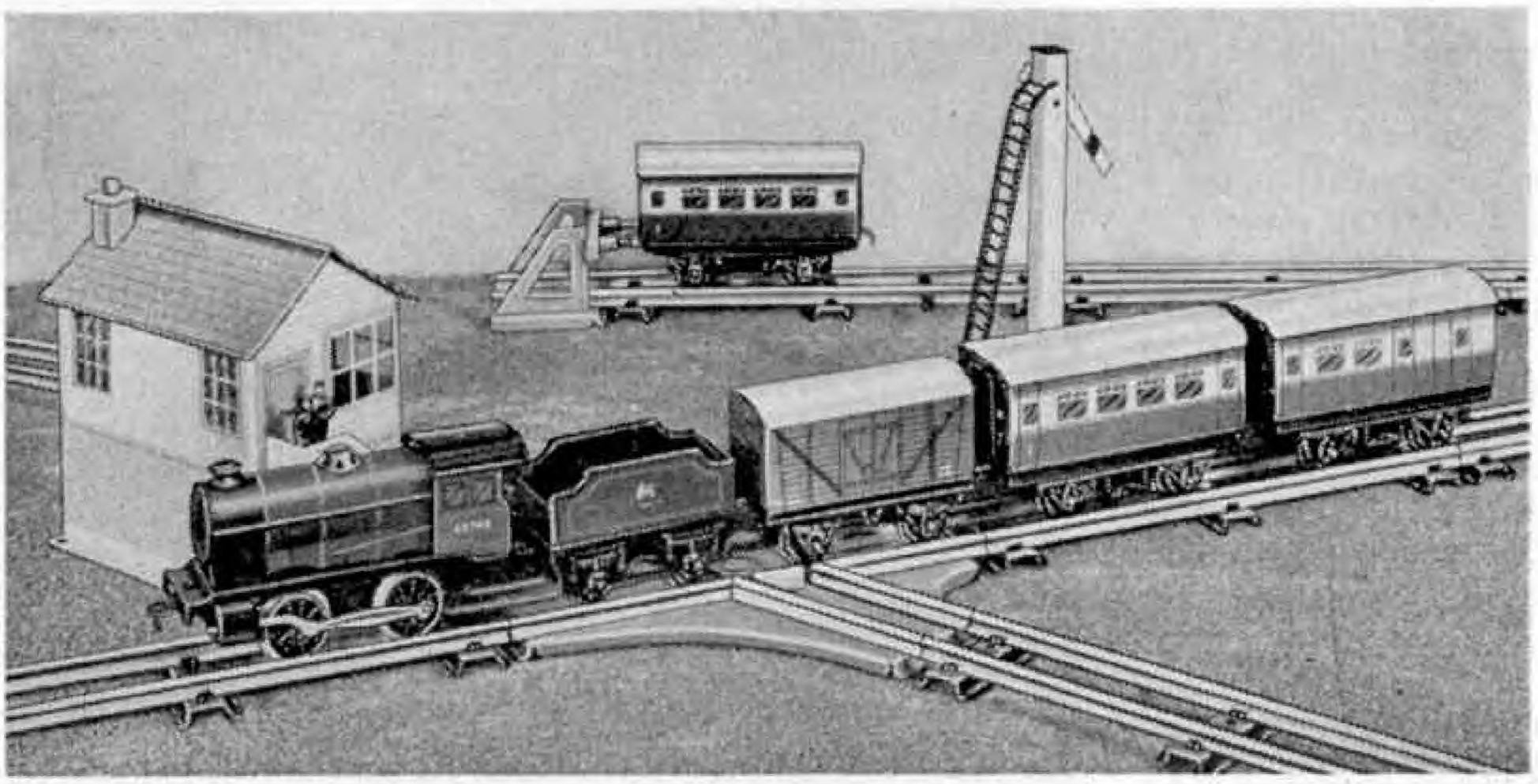
A train of Hornby Hopper Wagons is being shunted, while another goods train waits on the track in the background.

Owners of the smaller Hornby Trains can amuse themselves with similar variety in their train running. The No. 20/21 range includes a range of different vehicles, mostly of goods type, that can be coupled with the slightly larger items of the No. 30/31 series, and some good railwaying is to be had in this way, especially where two or more owners combine their equipment.

In the lower picture here a passenger train of No. 31 stock is conveying a No. 30 Van "inside the engine," that is to say between the tender and the train. As a rule a combined layout includes several Points and Crossings, so that smart work on the part of the operators will be necessary at times if there is more than one train running.

In our picture two routes cross one another by means of the familiar Acute Angle Crossing, but the train has a clear road, as is shown by the Signal protecting the Crossing. Of course there is a Signal Cabin nearby, and the two miniature figures at the head of the stairway are carefully watching the train as it passes.

Probably most of you read the short article last month *Tippers and Hoppers*. So I have no hesitation in including the picture above showing on the near track a train of Hornby Hopper Wagons being shunted by a No. 40 Tank. The Hopper Wagon has bottom discharge doors and this makes it very useful for ballasting operations if your ideas run in this direction, for the ballast can be dumped straight on to the track. What you use for ballast will depend a lot on where your railway is situated, but many model shops nowadays sell imitation ballast material that I can best describe as plastic chips. This is clean, so you can use it freely.



A Hornby train of No. 30/31 stock has a clear road over the Acute Angle Crossing, where two routes intersect.

Of General Interest



One end of a screwdriver with a "handle" 100 ft. long. Photograph by courtesy of the Boeing Airplane Company, Seattle.

THE engineers of the Boeing Airplane Company have developed a screwdriver 100 ft. long that may well be the longest in the world. I should certainly like to hear of one that is longer.

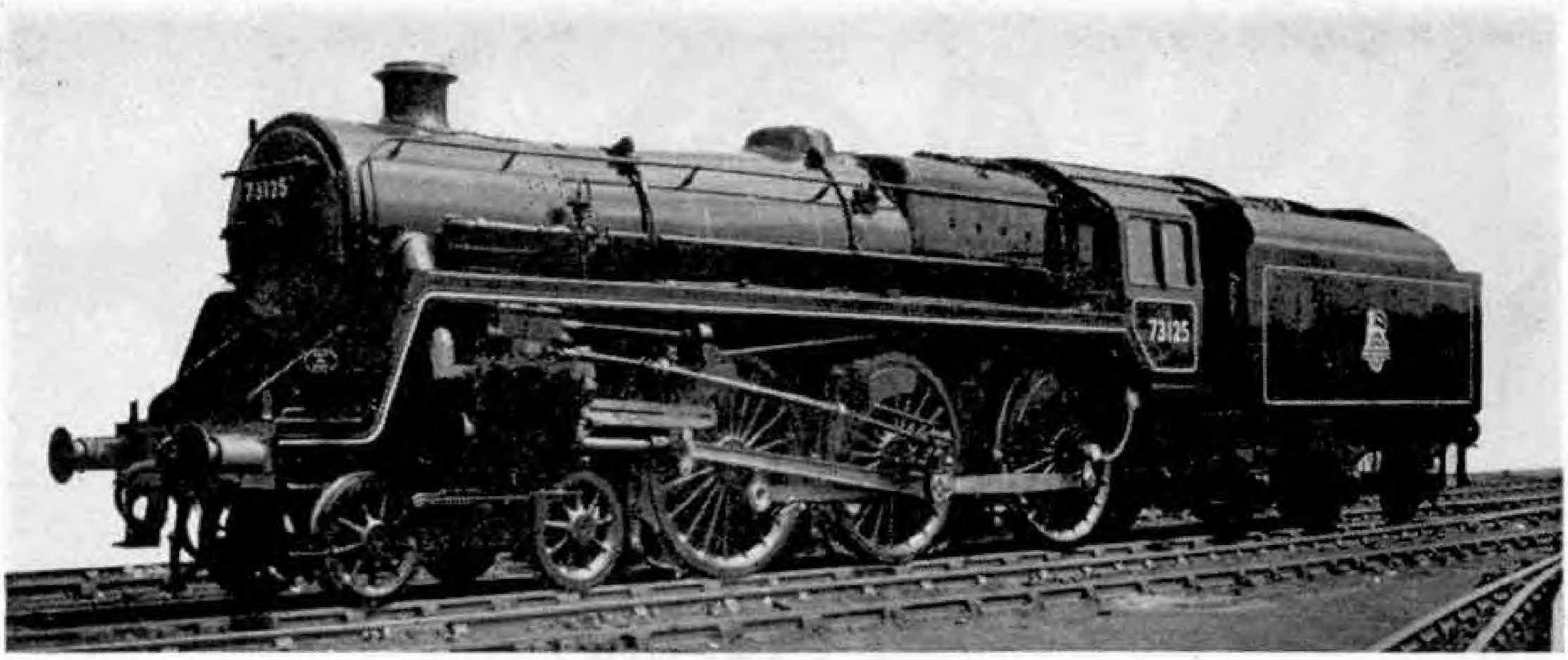
One end of the screwdriver is shown in the illustration above, and if you have not already guessed that the "handle" is not an ordinary one you will realise it as soon as you examine the picture. Instead of a wooden or steel handle, it has an electric cable measuring 100 ft. One end of this, with two screwdriver heads, is in the small box you can see in position on the aircraft engine, and the other in a distant control box.

This unusual electrically operated screwdriver was designed to allow a mechanic in the cockpit of an aeroplane to make adjustments of fuel controls on a jet engine far out on the wing. The device has been given the imposing name of "Remote Engine-Trim Actuator." It has worked so well in tests that a number of these units are being built by Boeings.

In use the screwdriver heads may be attached to the inside of a jet engine and fitted into recesses in the fuel control screws. A mechanic can then take the control box at the other end of the cable into the cockpit of the plane, and there he can watch the instruments and make precise adjustments while the engine is running at full power. So one man can do the job that formerly required two equipped with telephones, who often had difficulty in exchanging information because of the noise and vibration caused by the engine under test.



Did you enjoy Christmas in this way? Juliet Lewis and her friend Richard Thorne must have had a very happy time during the festive season.



B. R. Caprotti Class Fives

THE picture above shows the first of the series of B. R. Standard Class 5 Locomotives provided with British Caprotti valve gear in place of the Walschaerts motion fitted to the other members of the class, Nos. 73000-73124. This development no doubt follows on experience with the Caprotti-fitted class 8 4–6–2 engine No. 71000 *Duke of Gloucester* that was built at Crewe in 1954. This big engine remains the only one of its kind, but the present series of Caprotti class 5 4–6–0s will bear numbers up to 73154, making 30 such engines in all.

The application of Caprotti valves to the mixed traffic class has had an earlier parallel in L.M.R. practice, the highly successful Stanier class 5 design being amended in some of the later locomotives to incorporate this type of gear. One result of the modification externally was the somewhat ugly appearance at the front end owing to the prominent steam pipes. In these new B.R. Caprottis the steam pipe arrangement is similar, but as the foot framing of the standard design is carried high above the wheels and cylinders, and incorporates the now familiar so-called *Town Hall steps* at the front, the steam pipes are not so obtrusive.

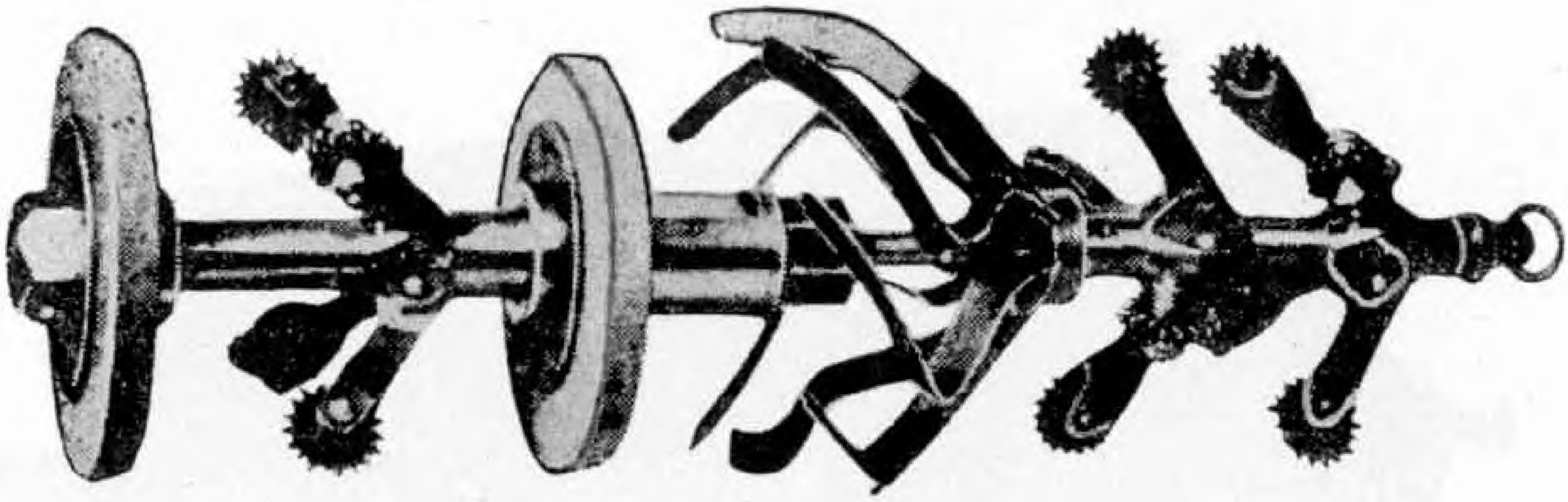
Instead of the conventional piston valves and Walschaerts motion, the valve gear now employed includes poppet valves. There are separate inlet and exhaust valves at each end of each cylinder and they are actuated by cams. Each valve is self contained, working vertically within a cage and the cam boxes housing them are situated on top of each cylinder. These boxes incorporate improvements developed as a result of experience from the L.M.R. Caprotti locomotives referred to earlier. The drive to the cam boxes is taken from the centre pair of coupled wheels by means of a return crank, at the outer end of which is a worm gearbox driving universally jointed tubular shafts that make up the transmission.

Variations in the cut-off in the cylinders, that so appeal to footplate observers, are obtained by adjustment of the inlet cams. Such adjustments, and that required for reversing the engine, are controlled from the reversing wheel in the cab. Like other poppet valve engines these Caprottis have a very satisfying bark, more explosive than that of their piston valve sisters.

The 30 engines in this new series incorporate various changes or improvements on the earlier ones, quite apart from the provision of Caprotti gear. Those that the lineside enthusiast will notice most, probably, will be that the tender is different and that the tri-tone whistle placed behind the chimney on the earlier engines is replaced in the new design by the B. R. standard whistle fitted in front of the cab. The tender shown behind No. 73125 above holds 4,725 gallons of water and seven tons of coal.

Gangway doors are now fixed on the cab of the engine, not on the tender, and another improvement is that the cab lookout windows are hinged, not fixed.

The new engines are being allocated to three Regions, 10 each to the London Midland, the Western and the Scottish. Those for the Western Region have provision for the A.T.C. system standard in that Region.



Go-Devils

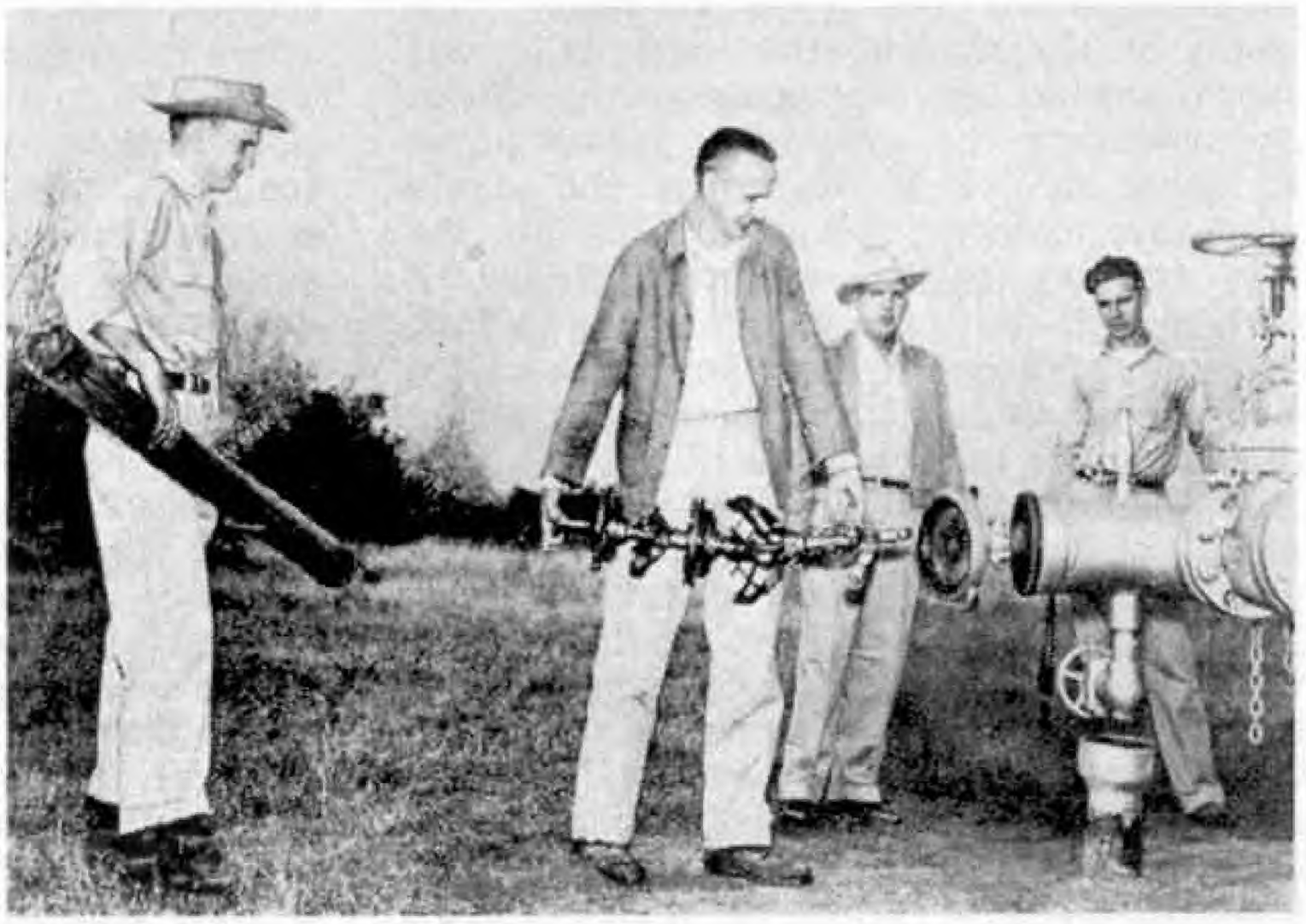
ALTHOUGH they work underground and get their name from a most disreputable character, "go-devils" are greatly respected in the oil industry, for they help to keep oil, gas and petroleum products flowing freely and purely through thousands of miles of pipeline throughout the world.

"Go-devil" is the original nickname given to devices introduced into working pipelines to clean the inside surface as the flowing oil pushes them along. Today, with the development of several types of cleaners, each has taken on its own name, such as "pig," "plug" or "scraper." Even the word "go-devil" is now used to describe a specific type of pipeline cleaner, one that has changed little from the first patented apparatus.

Most pipeline cleaners fall into three general classifications; scraper-type, brush-type and plug-type. The scraper-type cleaner, which actually is called a "go-devil," and also a "scraper," by pipeliners, has a series of spring-mounted knives, leather or rubber discs and guide arms mounted around a jointed steel rod. The discs, which are common to all cleaners, are the size of the inside diameter of the pipe, and form a wall against the crude oil or product which pushes the cleaner through the line. As it travels along, the cleaner removes deposits left by products flowing through the line, and also pushes out air, vapours and water, thereby reducing internal corrosion and increasing the through-put of the line.

The brush-type cleaner, often called a "pig," is a series of circular heavy fibre or steel brushes and rubber discs on a flexible steel rod. Its job is the same as that of the scraper-type cleaner. But it is used in pipelines which have little corrosion.

The plug-type cleaner, called simply a "plug," is made up of a series of rubber discs or cups. When a new pipeline is being completed, it is used to remove loose debris —some of it full of surprises—prior to closing and testing the pipe. In lines where corrosion is slight, plugs are also used to push out water and vapours.



The scraper-type cleaner seen at the head of the page differs little from the original go-devil. On the right, one of these is being inserted in a pipeline.

To keep products pure in a pipeline that carries several different petroleum products, one behind the other, plug-type cleaners are sometimes used to separate the batches. As the flow of one product ends, a plug is sent into the line with split-second timing before the new product begins to flow.

The cleaners are made up in different combinations of parts, according to the need. For example, the scraper-type cleaner can have different combinations of knives, guide arms and discs, which are interchangeable on the central shaft. The make-up of the cleaners is usually determined after trying several combinations in a line.

Shell Pipe Line Corporation in the United States uses all three types of cleaners. The type of cleaner used and the intervals between cleanings depend first on the waxing and corrosive characteristics of the crude or product being pumped through the line, and secondly on how close to the maximum pumping rate the crudes or products are moving through the line.

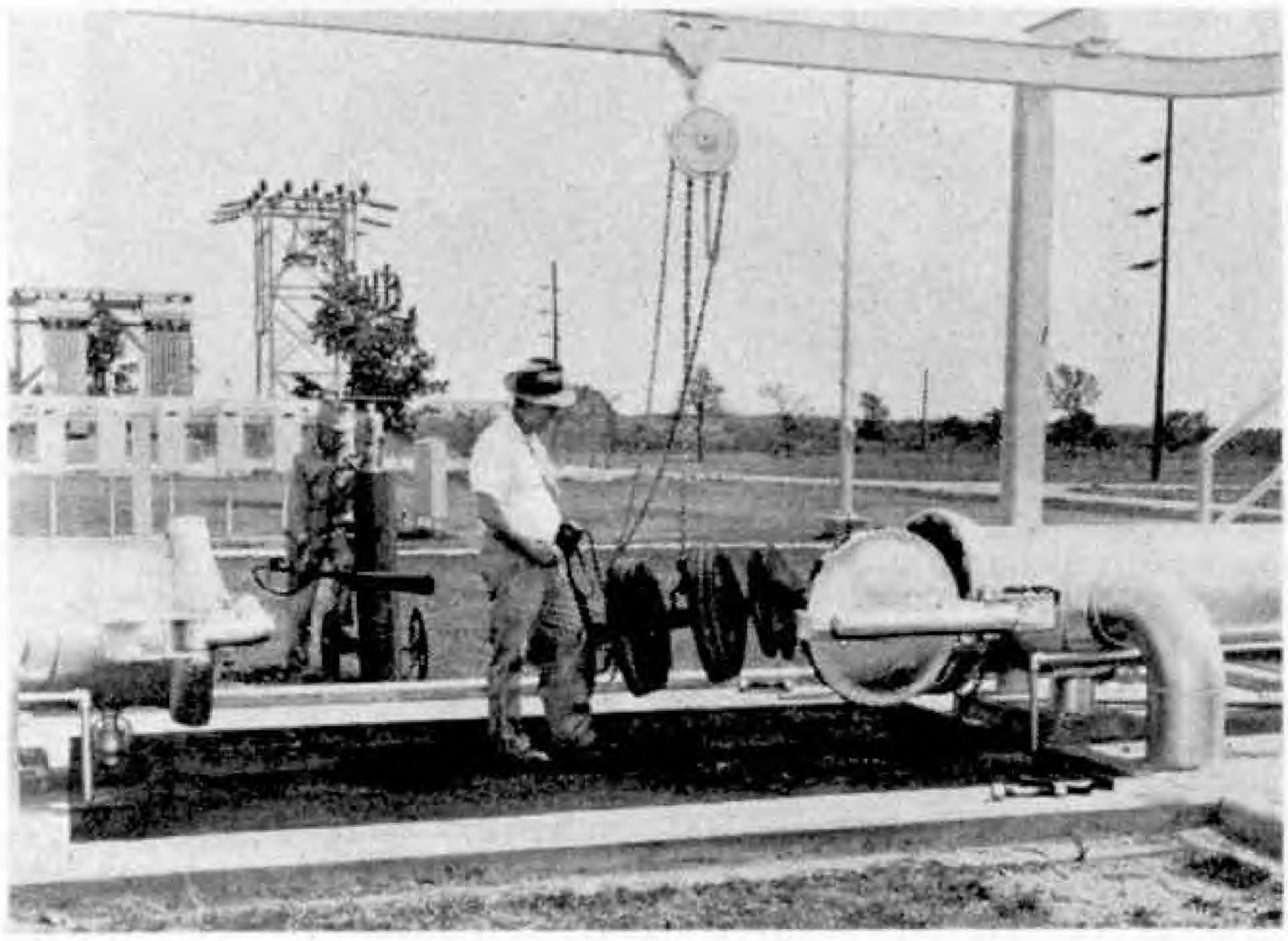
Pump stations along Shell Pipeline routes are spaced at about 50-mile intervals. Each station has "scraper traps," where each incoming cleaner is removed from the line and a new or reconditioned cleaner is put in to continue the cleaning to the next station. On removal from the line, each cleaner is inspected, cleaned and, if necessary, repaired.

A cleaner travels through a line about as fast as a man walks. As it moves along, a humming whine that can be heard above ground is made by its scraping knives or brushes, the notched wheels on its guide arms, and the rubber discs pressing against the walls of the pipe.

The speed and sound of a moving cleaner are important factors in tracing those cleaners that occasionally get stuck. When one cleaner stalls, another is put into the line and a man follows its hum as it moves along underground. When the sound stops, it is an indication that the stalled cleaner has been reached. The spot is then marked and a crew is called in to cut the pipe and remove both cleaners. In some cases, the moving cleaner will dislodge the stalled cleaner and they travel together to the next pump station.

The first pipeline cleaner was used about 1880 by the Tide Water Company Ltd., builders of the first oil pipeline from Western Pennsylvania to the Atlantic.

The first section of this company's pipeline was laid during the winter on the surface of the ground. When warm weather came, the pipe expanded in length, pushing down trees and telegraph poles. A competing company had the opposite difficulty—contraction in winter parted its pipe.



A chain hoist is needed when inserting a heavy 24 in. diameter plug into a pump station scraper trap.

The Tide Water pipe was then placed underground, but the lower temperature of the oil flow beneath the surface caused a paraffin-like deposit to form on the inner walls of the pipe, decreasing the flow. Chemical solutions failed to dissolve the deposit, and an experimental ball-shaped scraper was worn out by friction after being pumped only a few miles through the line.

Finally, an arrangement of leather and sheet-iron washers strung on a bolt was designed and pumped through the line. The wax deposits, as well as debris which had been left in the line during construction, were cleaned out by this apparatus—the first effective pipeline cleaner.

On 22nd December, 1885, John S. Klein obtained the first patent on a pipeline cleaner similar to those known today.

Although Klein's cleaner was first marketed as a "pipeline scraper," pipeliners dubbed the instrument "go-devil" because, as the story goes, many farmers, hearing the humming sound of the cleaners moving along underground, thought the devil was after them. Not until 1906 did the name "go-devil" become a formal title for a cleaning apparatus. At that time, a Pennsylvania company started manufacturing and marketing a cleaner based on the Klein patent under the title of Go-Devil.



Replacing rubber discs on a go-devil at a pump station repair shop. In the foreground are notched discs worn by use in a pipeline of varying diameter.

Through the years that followed, many modifications were made in pipe cleaners, and new patents were granted. But the basic design of several cleaners on the market today is that of the Klein invention. Among the significant modifications that have been made is a cleaner designed to be used in a pipeline of varying diameter. This innovation was developed in 1947 by Shell Pipe Line Corporation's engineering personnel. The engineers used a standard scraper-type cleaner, the size of the largest diameter of the pipe. Since both the guide arms and knives of the cleaner are flexible, it was only necessary for them to redesign the rubber discs, making them contractable, so that the cleaner could enter and travel through pipe of smaller diameter. They did this by notching two rubber discs and placing them together to provide a continuous face against the oil moving the cleaner through the pipe. When the cleaner enters a smaller pipe, the outer edges of the discs come together like the fingers of a hand.

The Shell-designed cleaner was first used on a line that has eight-inch cement pipe, six-inch steel pipe and six-inch cement-lined pipe. It has been used successfully since then in this and in other lines of varying diameter in the Shell Pipe Line Corporation's system.

Pipeliners tell many stories about the odd things cleaners have pushed out of pipelines. But the advent of the pipeline inspector on construction projects has cut down the number of objects, animate and inanimate, found in lines in recent years. One of the duties of the inspector is to see that each section of pipe laid is capped at the end of each day, thus barring entry to prowling animals. In addition, each section of pipe is swabbed out before it is welded to the line.

Despite this careful handling, cleaners sometimes push out strange objects as they travel through a line the first time. Shell pipeliners have reported such objects as rabbits, snakes, rats, fence posts, log chains, skids and railroad jacks. One of the most unforgettable finds was a dozen dead skunks. "Smelled like the devil," said one crewman. And he didn't mean the "go-devil" that pushed them out!

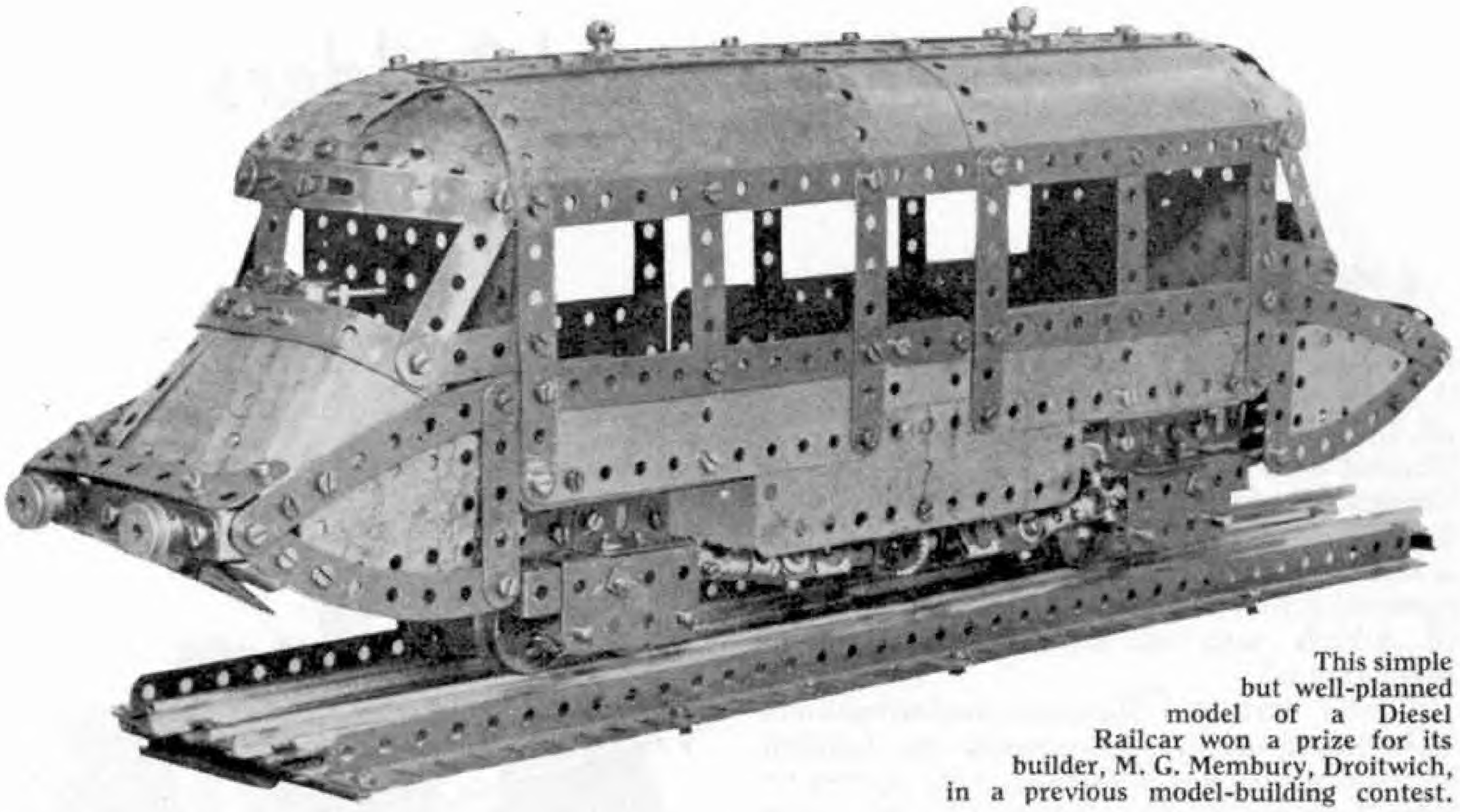
This article and the accompanying illustrations are reproduced by courtesy of the Editor, The Shell Magazine.

Cameras in Space—*(Continued from page 20)*

through space. All went well. The impact of the section containing the camera was unusually gentle and the film was safe inside its steel cassette.

Since then, many other rockets have been fired and many more photographs have been taken; but none from heights as great as those attained by Viking No. 11. The record may fall next autumn, during the International Geophysical Year experiments that aim at putting an artificial satellite into orbit 200 miles above the Earth.

Far more exciting is the possibility that, one day, it may be possible to receive television pictures of our Earth, transmitted from a satellite as it orbits at 18,000 m.p.h. above our heads. Like the whole science of rocketry and space-flight, high-altitude photography has a future full of interest and excitement.



This simple but well-planned model of a Diesel Railcar won a prize for its builder, M. G. Membury, Droitwich, in a previous model-building contest.

Winter Model-Building Competition

Can You Build a Prize-winning Model?

THIS is the last opportunity we shall have to remind readers of the grand prizes offered for the best models entered in the Winter Model-Building Competition. Most competitors living Overseas will have sent off details of their models already, but there is still time for Home readers to build their models and send details of them along, so we urge those who have not yet done so to start preparing their entries now.

Boys who have started the Meccano hobby for the first time with Outfits they received at Christmas should not be put off because of inexperience, or because they have only small Outfits. The size of model entered is not important, and full allowance is made for the age of each competitor, so that young model-builders and experienced Meccano enthusiasts alike will have equal opportunities to win the splendid cash awards offered as prizes.

THE PRIZES

The following prizes will be awarded in each of the Sections A and B.

	£	s.	d.
First Prize, Cheque for	4	4	0
Second Prize, Cheque for	2	2	0
Third Prize, Cheque for	1	1	0
Ten Prizes, each of		10	0
Ten Prizes, each of		5	0

Entries can be based on any subject. Cranes, ships, vehicles, machines—in fact all things that can be represented in Meccano are suitable. You can make use of any number of parts or any Outfit in the range, and indeed your model need not conform to the parts in any particular Outfit. But each entry should be based on a subject well within the scope of the parts available, so that it can be modelled really well.

The competition is divided into two Sections: Section A for competitors under 12 years of age on 31st January next, and Section B for model-builders who will be 12 or over on that date. Entries must consist of photographs or sketches of models, together with any notes you consider necessary to explain points of special interest. *Actual models must not be sent.* Each competitor must write his age, name and address clearly on the back of each print or piece of paper submitted, and entries must be sent to *Winter Model-Building Competition, Meccano Limited, Binns Road, Liverpool 13.*

Don't delay! You have until 31st January next to send in details of your model, but we cannot accept entries received after that date.

Among the Model-Builders

By "Spanner"

A Meccano South-seeking Chariot

Regular readers will remember the interesting article by Mr. F. W. Cousins, A.M.I.E.E. in the September 1955 *M.M.* describing a South-seeking Chariot said to have been used by the Chinese about 2634 B.C. This article described in detail the mechanical arrangement and the method of operation of the Chariot, the main feature of which was a form of differential mechanism.

I fully expected Meccano model-builders to be intrigued by the ingenious mechanism of the Chariot, and I was sure that sooner or later I would receive details of a Meccano model of the device. My expectations were realised some time ago when I heard from Mr. M. J. Oliver, Morpeth, a keen model-builder who succeeded in reproducing the mechanism of the South-seeking Chariot neatly and efficiently. Mr. Oliver's model is illustrated in Fig. 1.

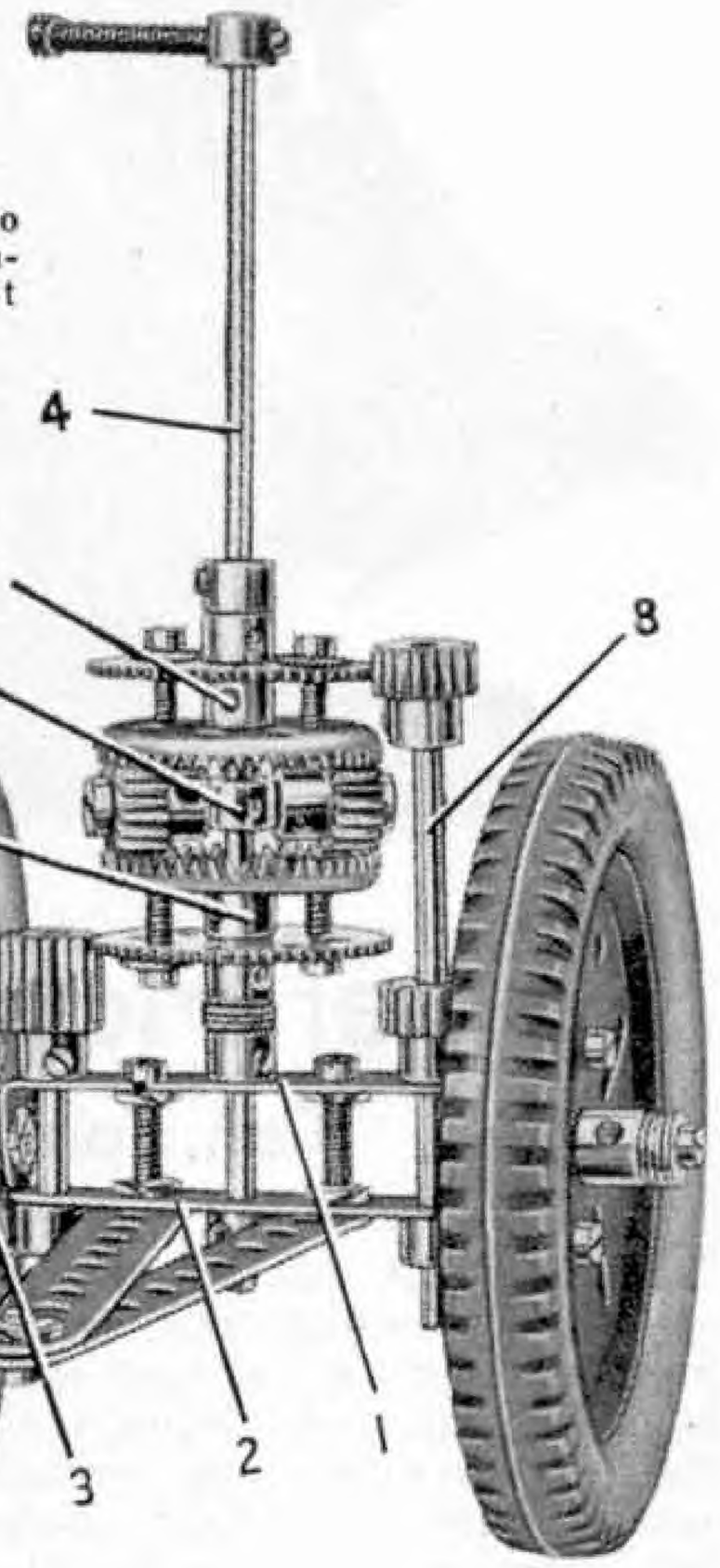
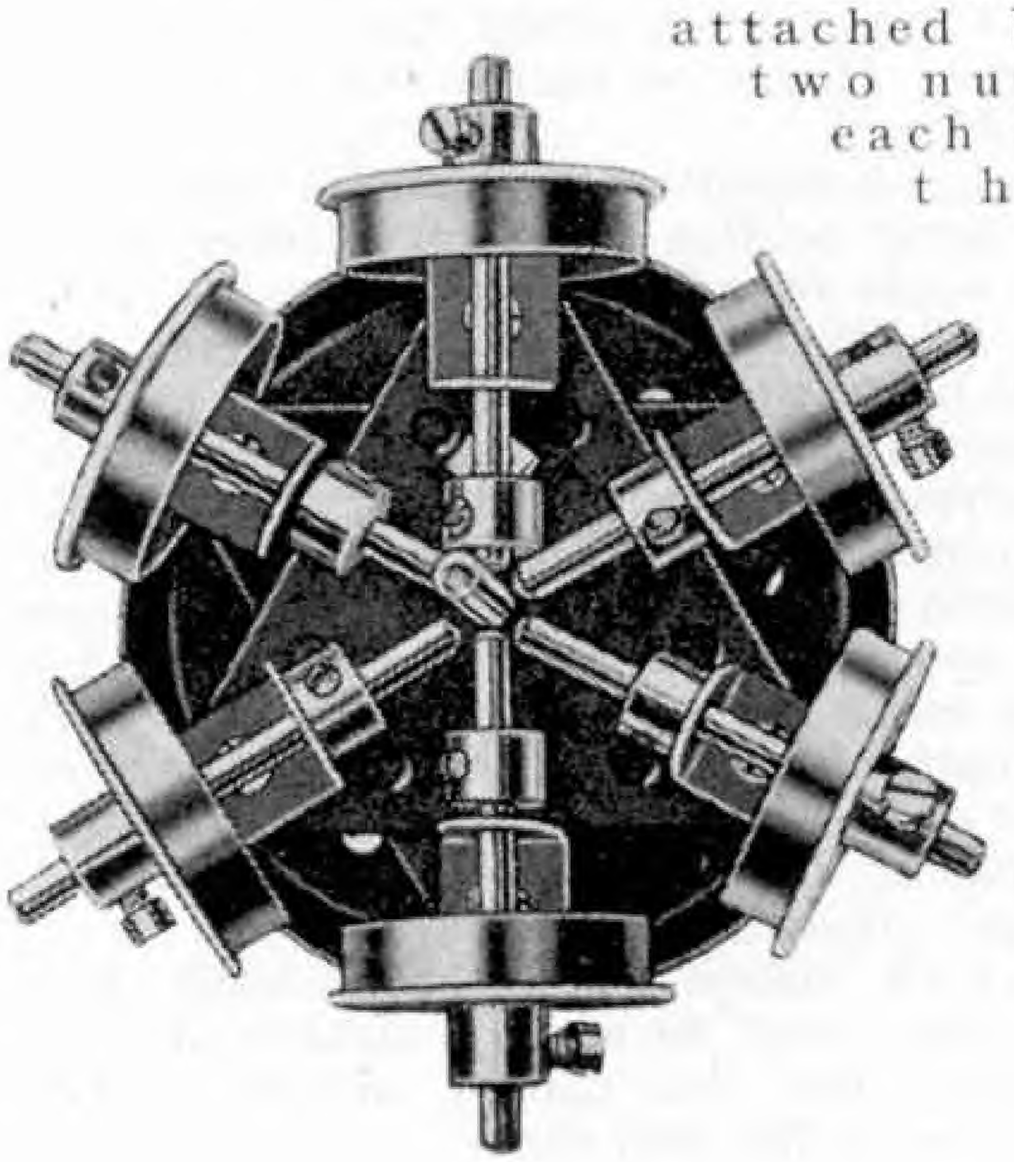


Fig. 1. The Meccano version of the South-seeking Chariot designed by Mr. M. J. Oliver, Morpeth, which is described on this page.

The frame of the Chariot consists of a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip 1 and a $2\frac{1}{2}''$ Strip 2 connected by two $\frac{3}{4}''$ Bolts. These Bolts secure also two $5\frac{1}{2}''$ Strips that form a towing bar. The road wheels are 3" Pulleys with Tyres and they are mounted freely on $1\frac{1}{8}''$ Bolts. A $1\frac{1}{2}''$ Contrate 3 is connected to each Pulley by $\frac{1}{2}''$ Bolts, and the $1\frac{1}{8}''$ Bolts are attached by two nuts each to the lugs of Double Angle Strip 1. It is important to make sure that the distance between the centres of the road wheels is exactly the same as the diameter of the Tyres on the wheels, and the wheels should be spaced on the Bolts by Washers until the two measurements are identical.

The centre shaft of the mechanism is a $6\frac{1}{2}''$ Rod 4. This carries a "spider" 5 from a Swivel Bearing and two gear assemblies 6 and 7, each of which consists of a $1\frac{1}{2}''$ Contrate and a 57-tooth Gear connected



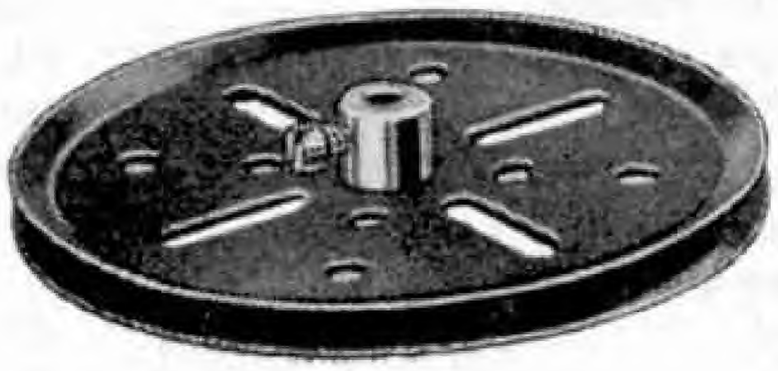
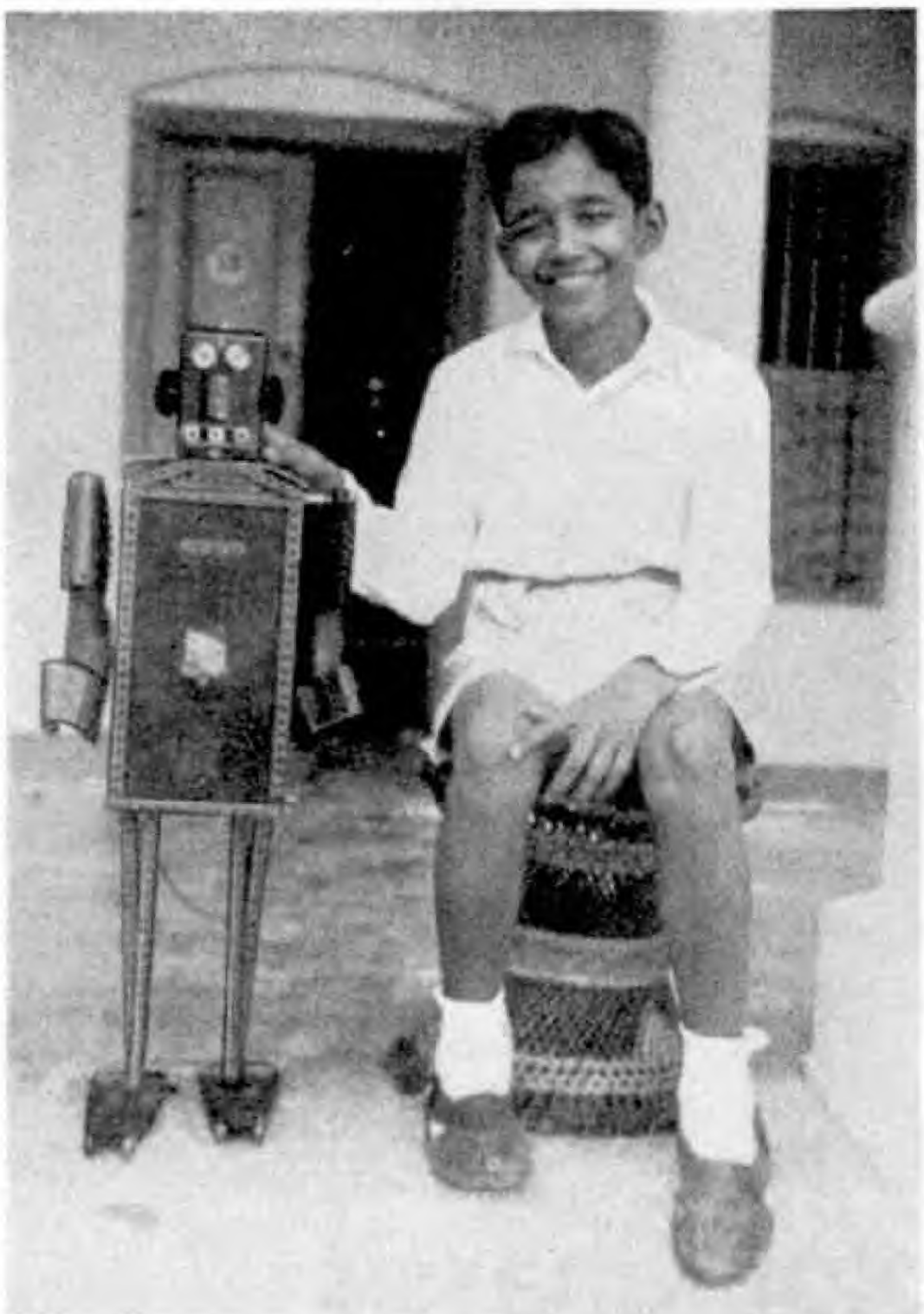


Fig. 2. A good use for the Meccano large Triangular Plate is shown in this six-roller bearing designed by E. H. L. Roden, Truro. Details are given on the next page.



This cheerful Indian boy is Chandrashekar Murthi, Vellore, India, and he is obviously very proud of the model mechanical man seen in the picture, which he built with his No. 8 Outfit.

by $\frac{3}{8}$" Bolts. The gear assemblies are loose on Rod 4, but the "spider" is fixed on the Rod and carries two Pivot Bolts, each of which is fitted with a $\frac{1}{2}$" Pinion. These Pinions mesh with the $1\frac{1}{2}$" Contrates of the gear assemblies. A $\frac{1}{2}$" diameter, $\frac{1}{2}$" face Pinion connects the assembly 6 to one of the Contrates 3, while the assembly 7 is connected to the other Contrate 3 by two $\frac{1}{2}$" Pinions on a Rod 8.

The indicating pointer fixed to the upper end of shaft 4, will be found to point always in the same direction no matter how the Chariot turns as it is towed along the ground.

A Novel Six-Roller Bearing for Cranes

Every model-builder knows that an outstanding feature of the Meccano System is the adaptability of the parts included in it. Practically every part has many uses, and from time to time my correspondence includes details of yet another example of a new use that has been found for one of the parts in the range. An example of this occurred recently when I received a letter from Mr. E. H. L. Roden, Truro, describing a compact roller bearing unit he has found very useful. This roller bearing is shown in Fig. 2.

The part for which a novel use has been found in this bearing is No. 76, $2\frac{1}{2}$" Triangular Plate. Two of these Triangular Plates are overlapped and bolted together in such a way that they form a six pointed star-shaped member. A Double Bracket is bolted to each point, with Washers under three of the Double Brackets to ensure that all six parts are at exactly the same level. A 2" Rod is passed through each Double Bracket, is fitted with a $1\frac{1}{8}$" Flanged Wheel and is held in place by a Collar.

The fixed member of the roller bearing is a 3" Pulley. This is bolted to the base of the crane and a Rod of suitable length is held in its boss. The Rod is passed through the centre holes of the Triangular Plates, a second 3" Pulley is placed on it and the assembly is held together by a Collar fixed on the Rod.

When this bearing is used in a crane the model can be slewed or rotated by passing a Driving Band round the fixed 3" Pulley and round a small Pulley held on a Rod mounted in the rotating superstructure.

Meccano in the Laboratory

An interesting application of Meccano outside the run of ordinary model-building was brought to my *(Continued on page 50)*

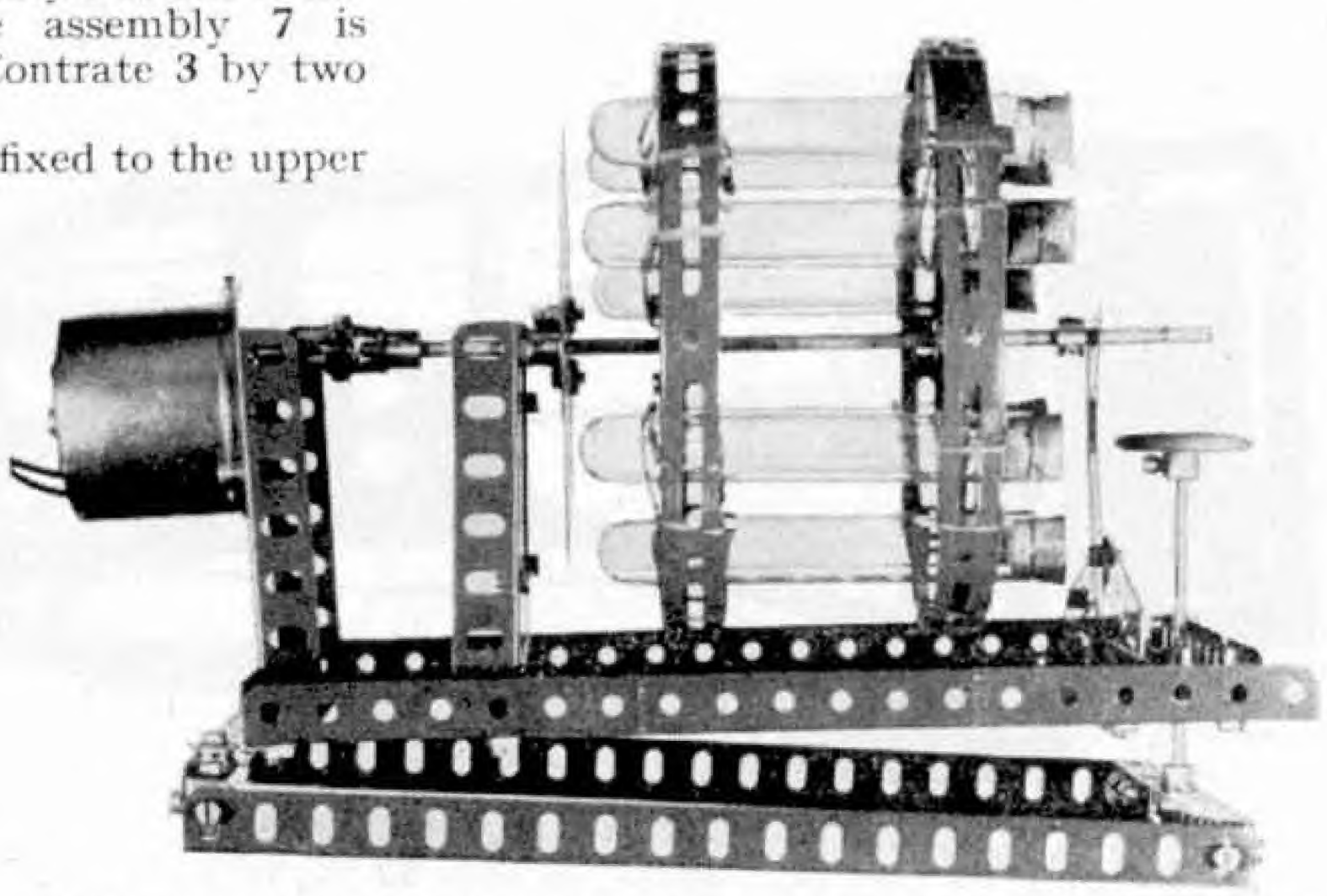


Fig. 4, Laboratory apparatus built in Meccano for use in tissue-culture processes. It is referred to on this page.

MODEL OF THE MONTH

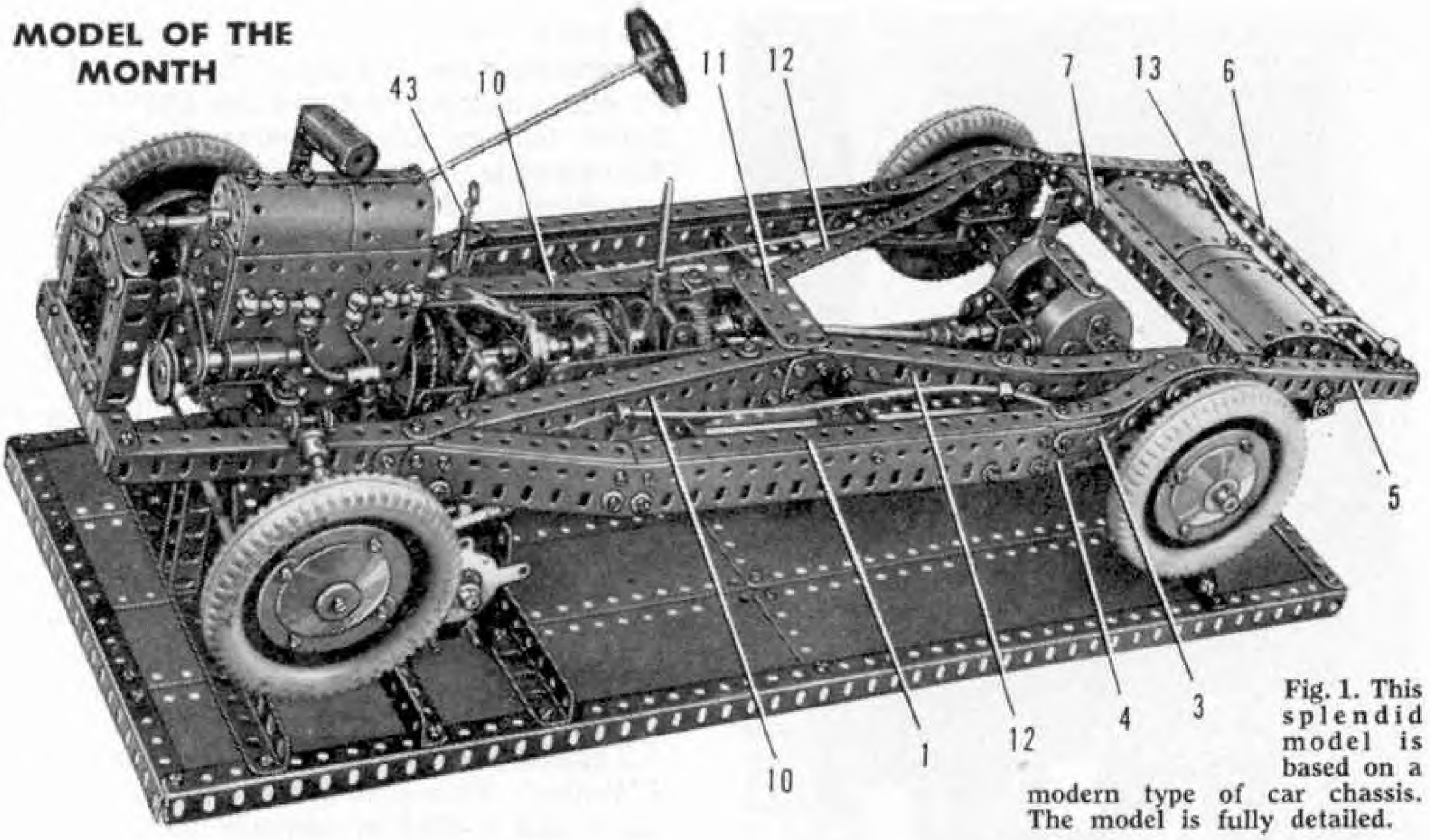


Fig. 1. This splendid model is based on a modern type of car chassis. The model is fully detailed.

A Modern Motor Chassis

MOTOR vehicles, with their many ingenious mechanisms, make excellent subjects for Meccano models and it is not surprising to find that models of cars, lorries, etc., appear regularly among entries in *M.M.* model-building contests. There is no doubt whatever that a fully equipped motor chassis, with steering, brakes, clutch, gear-box and differential mechanism, is particularly interesting to build and to operate, and for our January Model of the Month therefore an excellent example of a modern car chassis in Meccano has been chosen.

The model has independently sprung front wheels, so that it is really up to date.

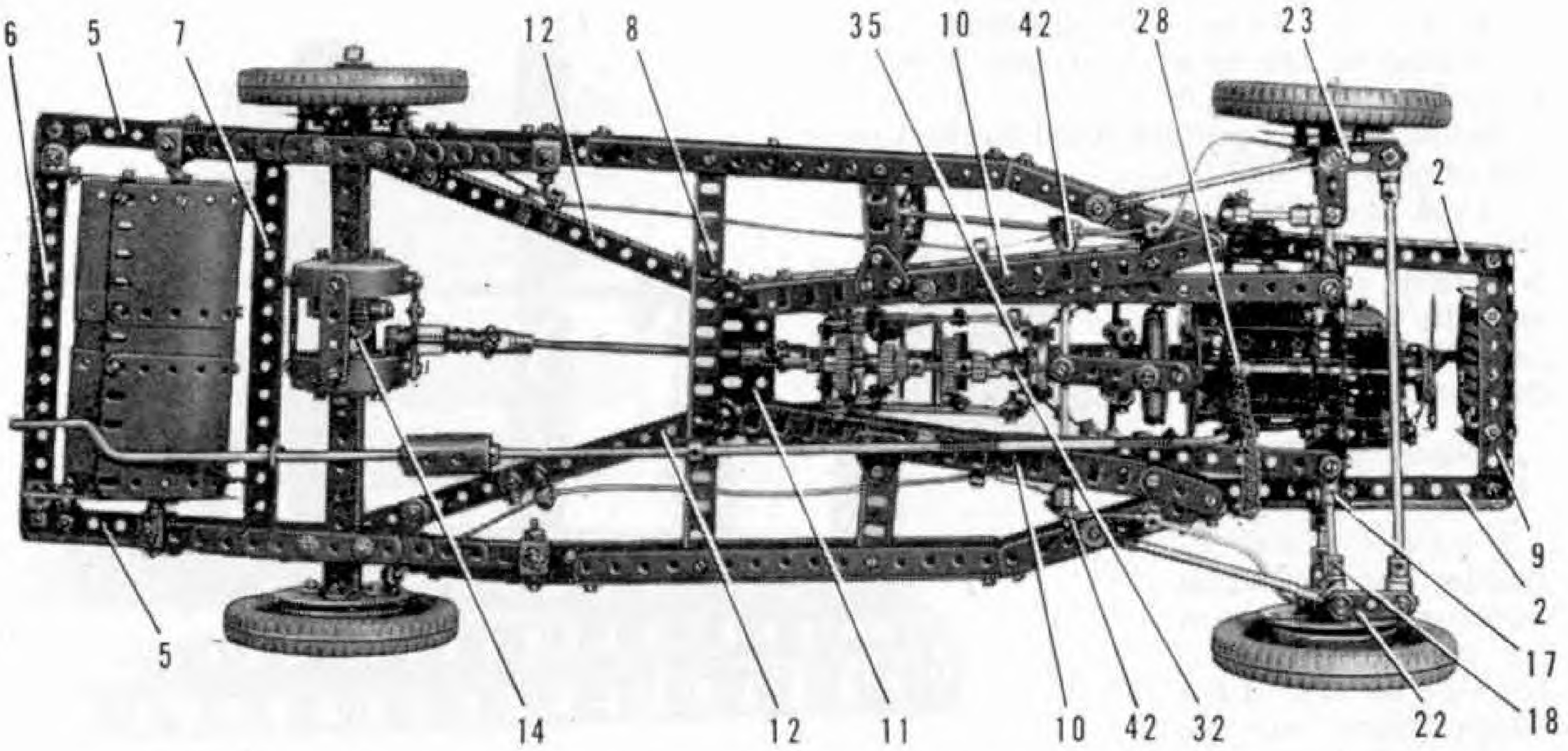


Fig. 2. The general arrangement of the Chassis can be seen in this underneath view of the model.

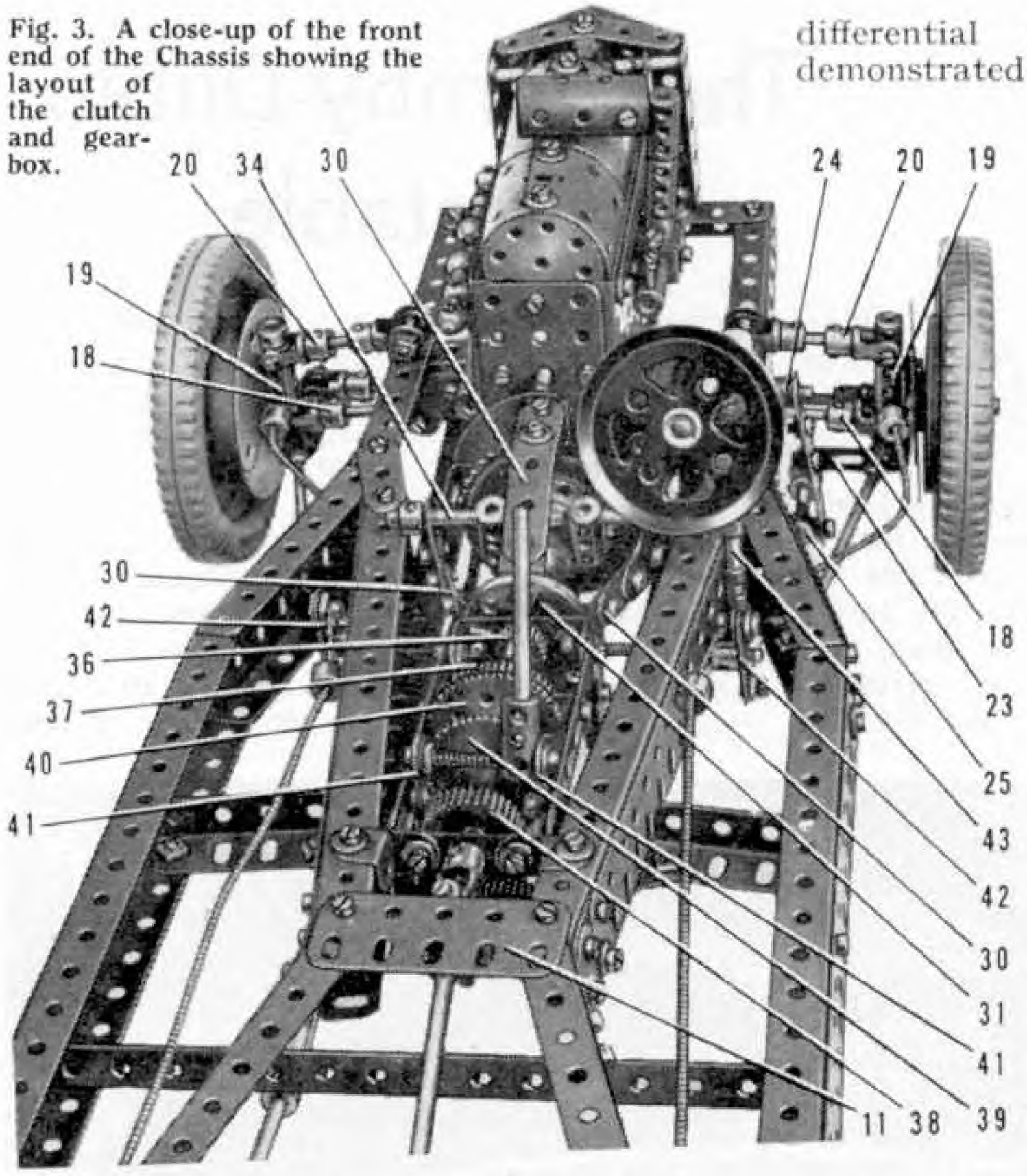


Fig. 3. A close-up of the front end of the Chassis showing the layout of the clutch and gear-box.

differential mechanism, etc., can be demonstrated and studied much more easily than is the case in a model designed to travel along the ground.

The gear-box gives three forward speeds and one reverse. In the model the change speed lever is locked in position so that top gear is engaged, but the lever can be released and the gears arranged to allow gear changing.

Full constructional details and a list of the parts required to build this splendid model can be obtained by writing to the Editor, enclosing a 2d. stamp for postage. Readers living in Canada, Australia, New Zealand, South Africa and Ceylon can obtain copies of the Instructions for building the *current* "Model of the Month" by writing to the main Meccano Agents for those countries and enclosing stamps for postage.

It is driven by an E 20 R (S) Electric Motor, but an interesting variation from the usual type of Meccano vehicle is that the Motor is fitted to a base that supports the model and is linked to the realistic chassis engine unit by Sprockets and Chain. The chassis is supported so that its wheels are clear of the base, and thus the action of the steering, clutch,

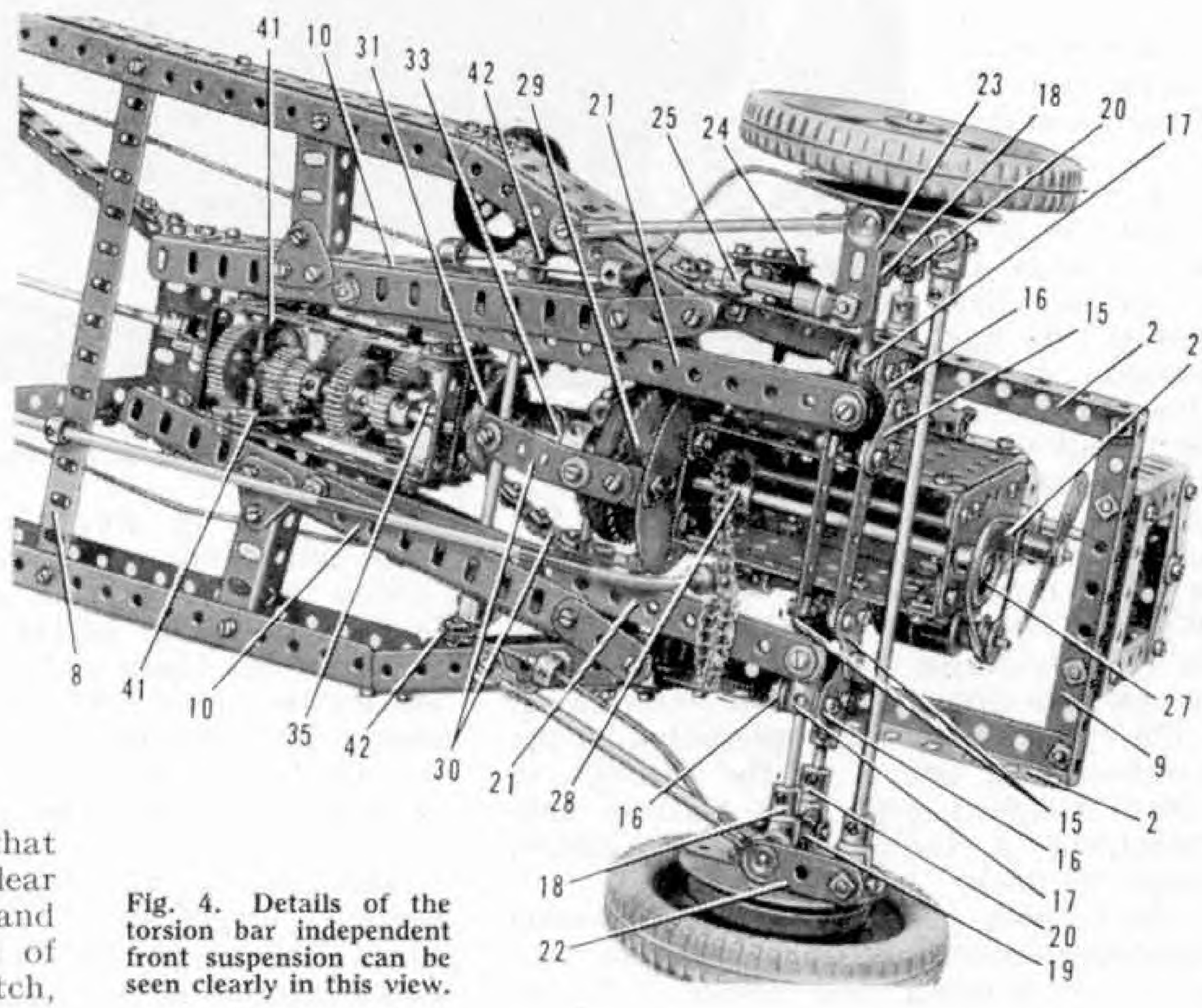


Fig. 4. Details of the torsion bar independent front suspension can be seen clearly in this view.

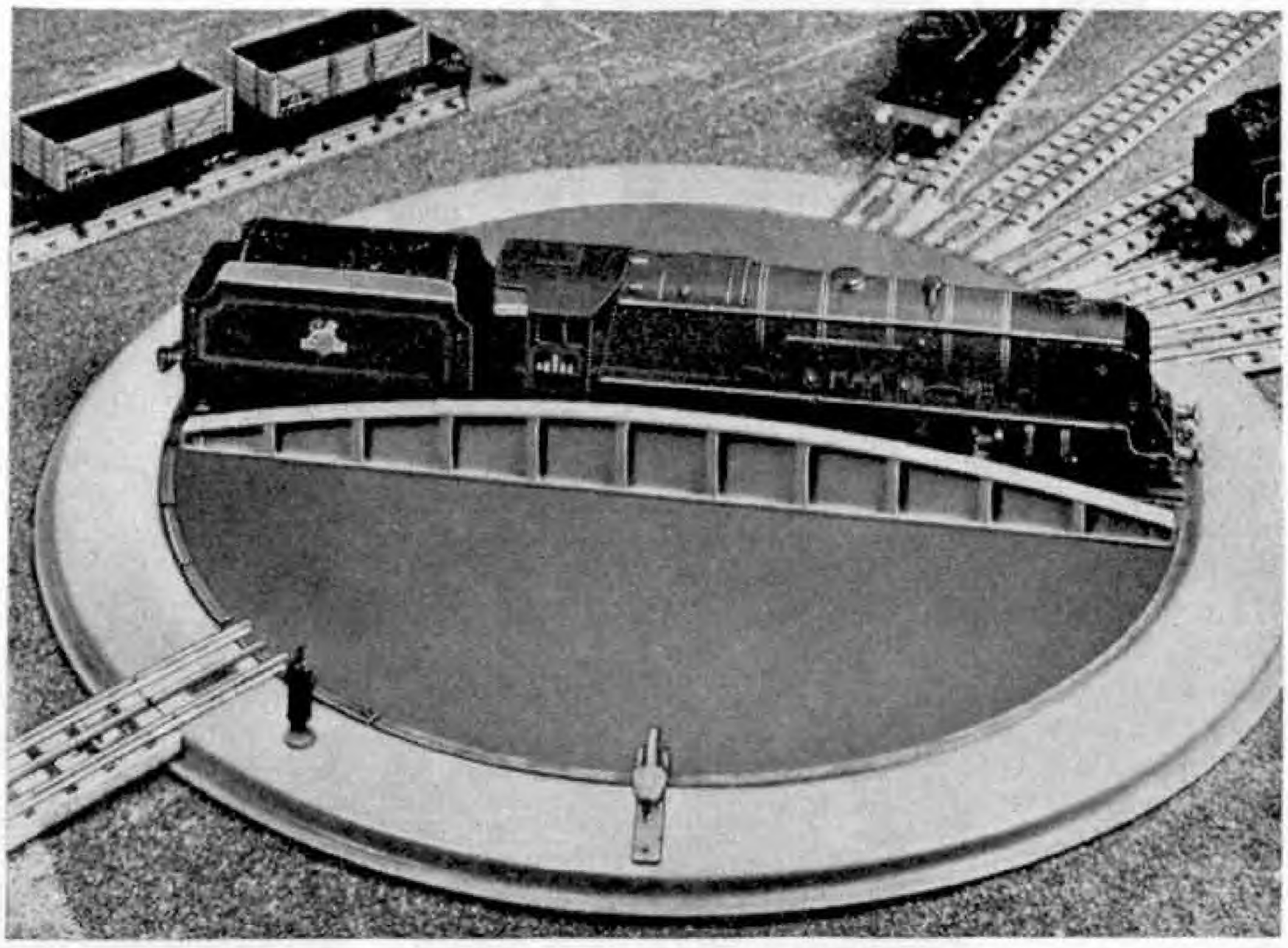
HORNBY RAILWAY COMPANY

By the Secretary

The Hornby-Dublo Turntable

BY way of giving the New Year a good start I am particularly pleased to be able to tell you about the Hornby-Dublo Turntable, a new item that will be welcomed gleefully by Hornby-Dublo enthusiasts. The two pictures showing the new Turntable in use have been prepared specially for the benefit of those of you who have not yet been able to see this latest addition to the Hornby-Dublo range. It looks good and I am sure that you will find it extremely attractive, and valuable in your layouts.

The first duty of any turntable is to provide the means of turning an engine round. But turntables are often required to do more than this. They can be made to lead to a selection of tracks, usually near the engine shed or in the locomotive yard. And the Hornby-Dublo Turntable has been designed so that it will do both these things in an admirable manner. It has therefore special advantages from the layout point of view that I am sure you will not be slow to appreciate. See how the real turntable in the lower picture on the opposite page serves several off-going tracks; and then notice how the Hornby-Dublo Turntable in the other two pictures does precisely the same thing.



"Duchess of Montrose" on the Turntable. The spring loaded locking device on the edge of the Turntable base is prominent in the foreground.

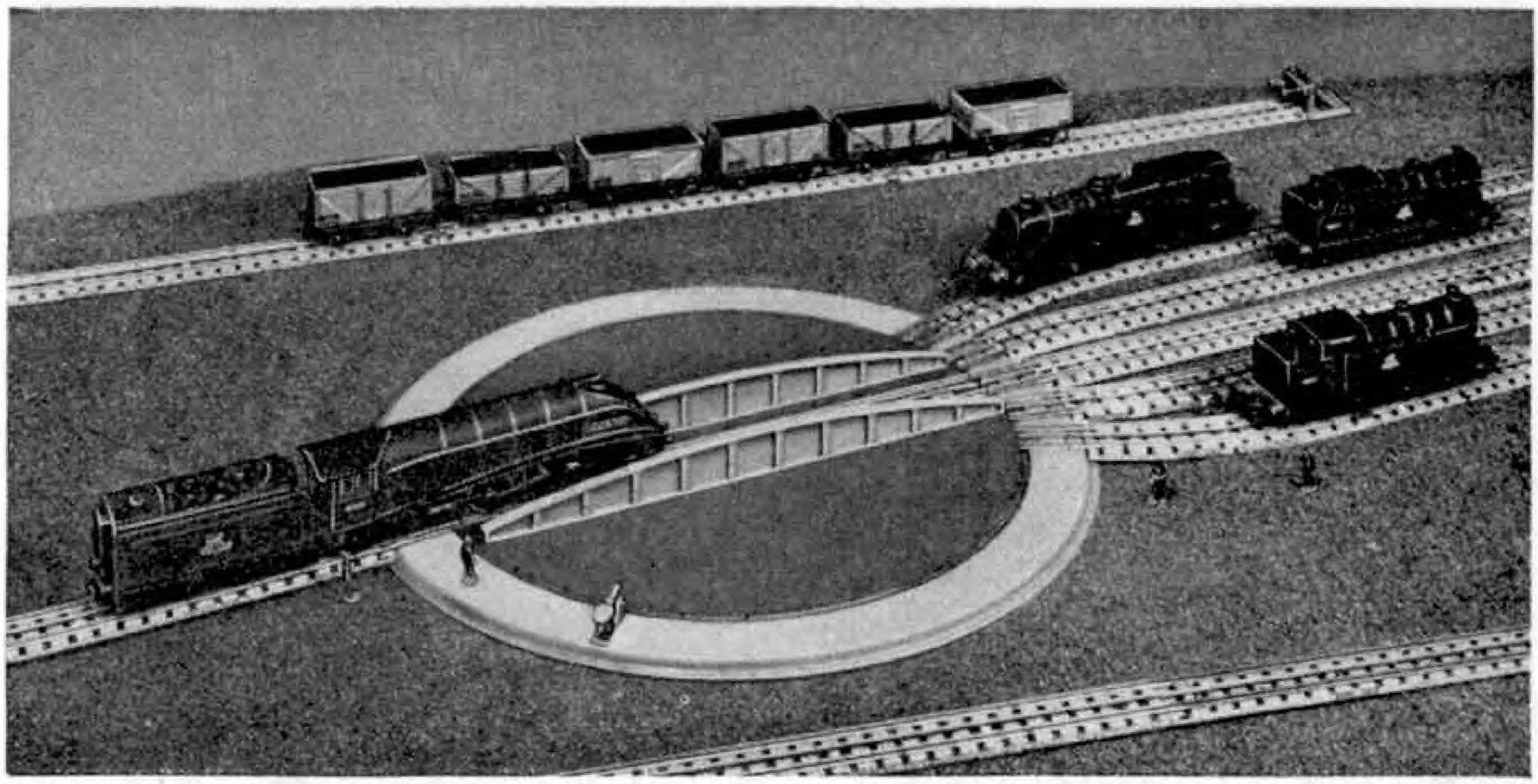
The type of turntable represented by the Hornby-Dublo one is of the through or centre balanced type, the turning part resembling a bridge with the girders above the deck.

The turning part of the Hornby-Dublo Turntable consists of an aluminium disc, on which running and centre rails are mounted, just as on a standard length of Hornby-Dublo straight track. This is carried on a base also formed in aluminium of a special grade, in order to obtain adequate strength in such a comparatively large component.

The length of the Turntable track is equal to that of an EDB1 Straight Rail. On each side of the track are the side girders, well detailed with the usual flanges and stiffening members found on this form of construction. These miniature girders are die-cast in zinc alloy, which gives them fine detail and great strength.

You will notice small slots at intervals in the outer edge of the circular turning plate. With these slots a spring loaded locking device or "key" near the approach side of the Turntable base engages, and so provides the means of securing the table in alignment with the inlet and outlet tracks.

The inlet and the outlet tracks are each equal in length to the standard Straight Short Rail of the Hornby-Dublo System, and the outlet tracks are spaced in such a



"Silver King" runs on to the Turntable. In this picture the new track component is seen in use for giving access to parallel yard tracks, as described in this article.

manner that five parallel engine shed roads can be formed, as shown in the upper illustration on this page.

The centre track is of course quite straight and is exactly opposite to the single inlet track. To each of the outermost yard tracks a Curved Half Rail is connected, and this is followed up by whatever number of straight rails are needed in the yard. Each of the two intermediate yard tracks requires a Short Rail to be fitted next to the Turntable, and this is followed by a Curved Quarter Rail, EDA1¼, a newcomer in the Hornby-Dublo system. This Curved Quarter Rail indeed has been specially made for use in conjunction with the Turntable and its effect is to bring the intermediate yard tracks parallel to those I have already mentioned. It will have its uses in general layout work, too, but we are not concerned with that in the present article.

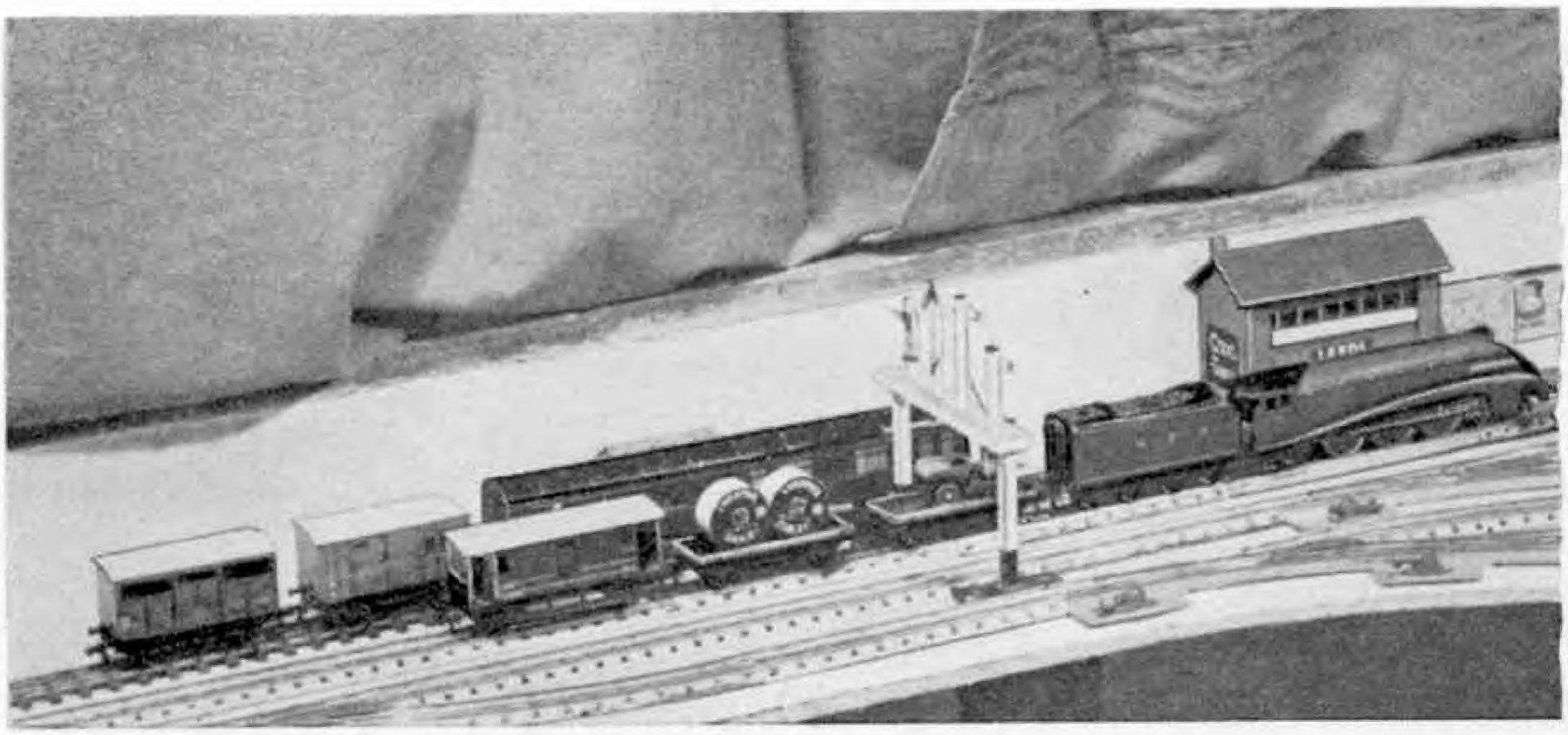
No switches or other devices are needed with the Turntable. Each of the outlet tracks is electrified when the Turntable is correctly aligned with it, the other outlet tracks then being dead.

The Turntable is hand operated, and moves smoothly and easily. While it is being turned with one hand you must keep a finger of the other hand on the spring loaded key of the locking device. When the required locking slot is opposite the key, removing the finger allows the lock to engage. Never drive an engine on or off the Turntable until you are certain that the Turntable is locked. Otherwise there may be a job for the breakdown gang!

In further issues I hope to include diagrams and pictures showing some of the uses of the Turntable in various layout schemes.



This real turntable, at Holyhead, has several shed tracks radiating from the turntable itself. Photograph by G. Clarke.



Station Working in Hornby-Dublo

MANY Hornby-Dublo layouts include a Terminal Station such as that shown in the composite illustration at the head of these pages. Ideas on station layouts and working therefore are always welcome, and I am sure that readers will enjoy examining the drawings reproduced here. They have been prepared by *Linesman*, who has previously contributed to our pages.

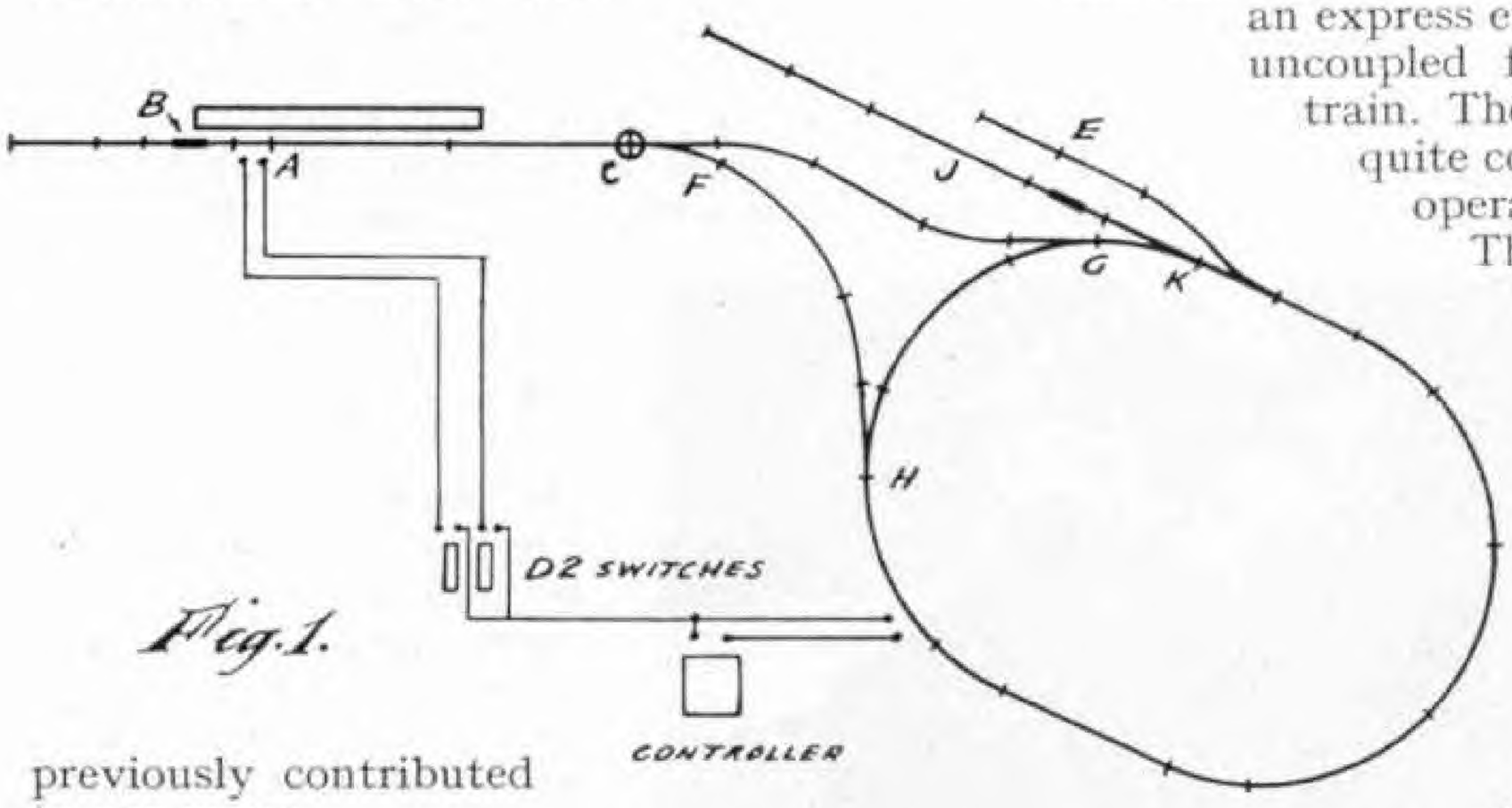


Fig. 1.

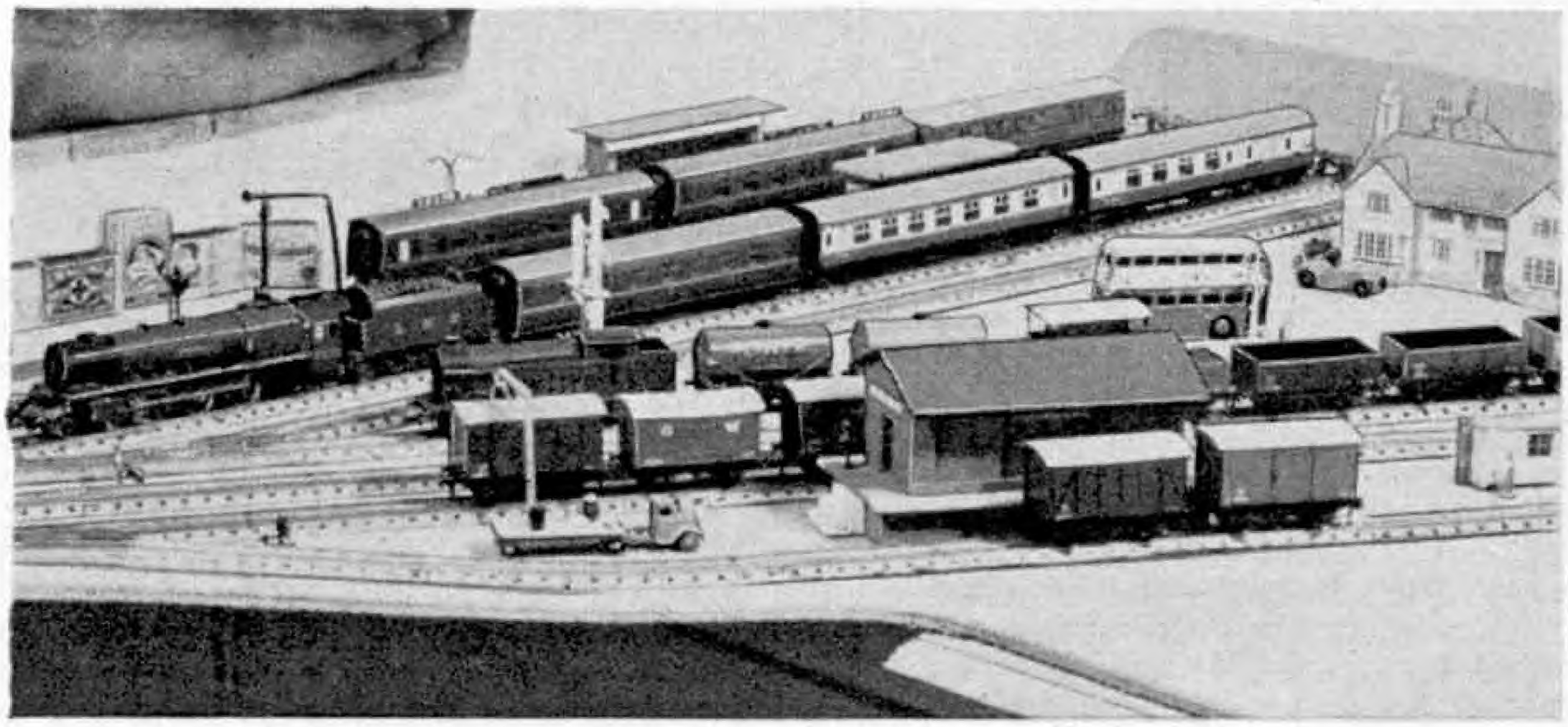
Let us suppose that the *Duchess of Montrose* has hauled a passenger train into a terminus station, and the engine has stopped just short of the buffers, with two or three coaches behind it. What is the next move—after the passengers have been given time to alight, of course?

Very often the layout is such that the express engine has to back the empty coaches out of the station. But look now at Fig. 1. This shows a layout that allows the empty coaches in the station to be removed by a second engine, an interesting and "stationlike" performance.

The essential features of the track at the terminus station shown are an Isolating Rail A, an Uncoupling Rail B, and a sufficient length of track between the latter and the Buffer Stops on the left to allow an express engine and tender to be uncoupled from the rest of the train. The Uncoupling Rail may quite conveniently be a hand-operated one.

The wiring circuit for the Isolating Rail is shown in the diagram. It provides for two separate sections of track, each controlled by a D2 Switch, one section of track between the Buffer Stop and the Isolating Rail and the other between the Isolating Rail and the Insulating Tab C. The second of these sections is not absolutely essential.

Now let us see how to use this set-up. The engine of an arriving train is run slowly past the platform until the coupling between the tender and the first coach is just beyond the ramp of the Uncoupling Rail. The engine is set back very slightly to uncouple and the section of track on



The picture spread across the two pages shows the terminal station on the Hornby-Dublo layout of Mr. C. G. Withers, Durrington, Wilts. The general layout is realistic and various buildings of home construction add considerably to the general effect.

which it is standing is made dead by the appropriate D2 Switch. Now a Tank engine is brought from the engine siding at E and is coupled to the rear coach; the empty coaches are taken by the Tank engine past Points F, G and K and are backed into the carriage siding J. The express engine can now be removed into the engine siding E.

Departures also can be made more interesting with this layout. If an express train is to start from the terminus station, the Tank engine takes the coaches from the siding J, round the loop, past Points H and F and into the station. The same Uncoupling and Isolating moves are made as before and then the express engine backs its tender onto the empty coaches and is coupled up. At this stage the section of track on which the engine is standing can be cut off by its D2 Switch, if the rest of the track is temporarily required for train working elsewhere.



Fig. 2.

It will be appreciated that, if there is no Turntable, a return loop or a triangular arrangement such as shown between the Points F.G.H. is necessary in order to allow the express engine and tender to be turned round.

If only one engine is available, the rail layout must be somewhat different, if backing the train out of a terminus station is to be avoided. Fig. 2 shows how this can be done. Again the same uncoupling movements are performed and the uncoupled engine is sent on past the Points. Then it is reversed and taken through the loop line M to run round the train. Here again, with a tender engine there must be a return loop or a triangular track, as seen in Fig. 1, to allow for turning.

It is quite a good idea to extend the track well beyond the Points to lead to a goods siding N, as shown in Fig. 3. Then it may be more convenient to put the passenger station alongside the loop line M. Goods trains will then have a straight run past the Points when using the siding.

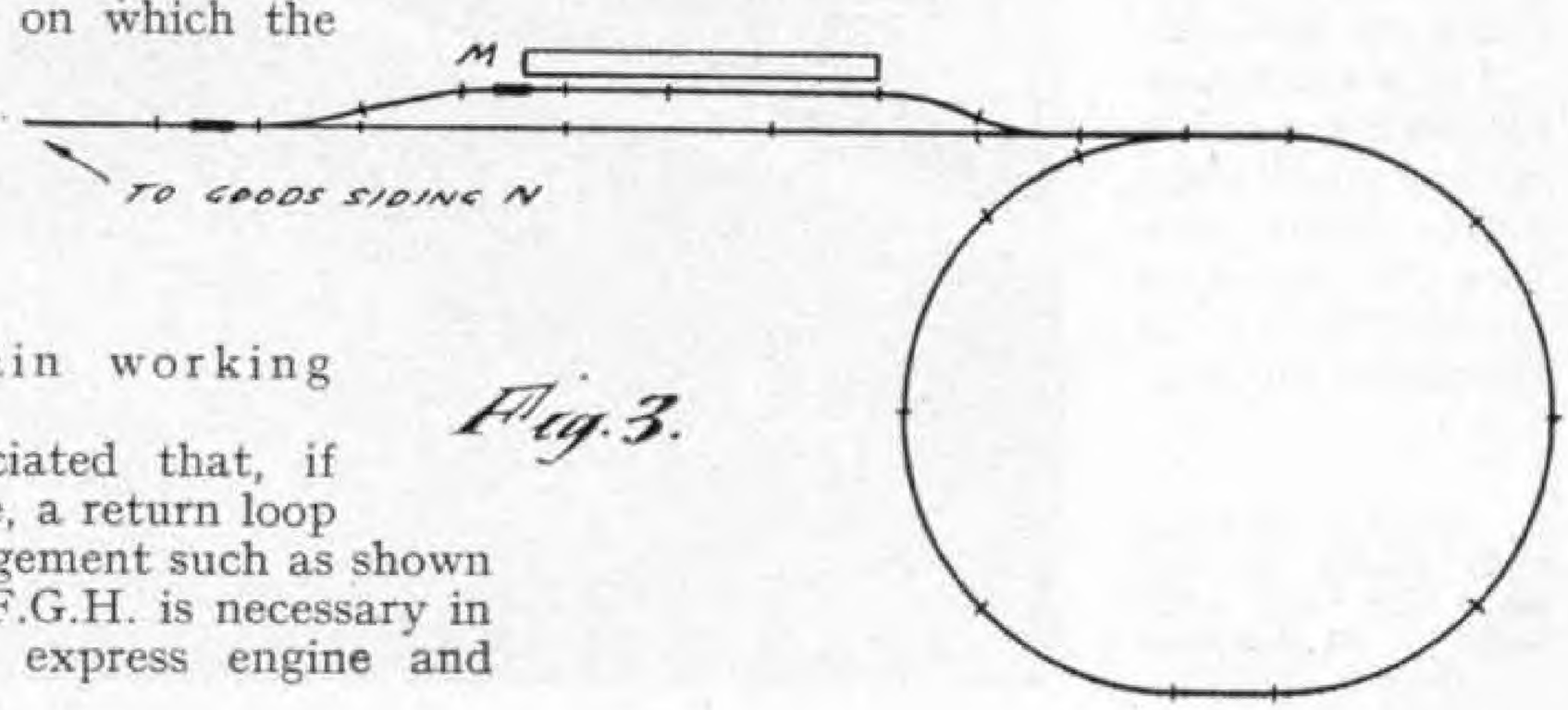


Fig. 3.

A Scene, For a Change

SOMETIMES, as a change from train running, Hornby and Hornby-Dublo owners like to arrange a railway scene rather than to put down a layout for actual operations. Perhaps they see something in real life that attracts them and then think it good fun to try to reproduce the incident or event in miniature and, as it were, "live" the scene all over again.

All readers must be familiar with the excellent layouts that illustrate the articles in the *M.M.* by *The Toyman* and it is something on these lines, but with railway material, that should be the aim of the miniature railwayman who wishes to try his hand at this sort of thing. Station scenes are often favourites with those who follow up this idea, a busy platform before the departure of a train or, at times, the equally busy scene after arrival, especially at a terminus, being particularly good subjects.

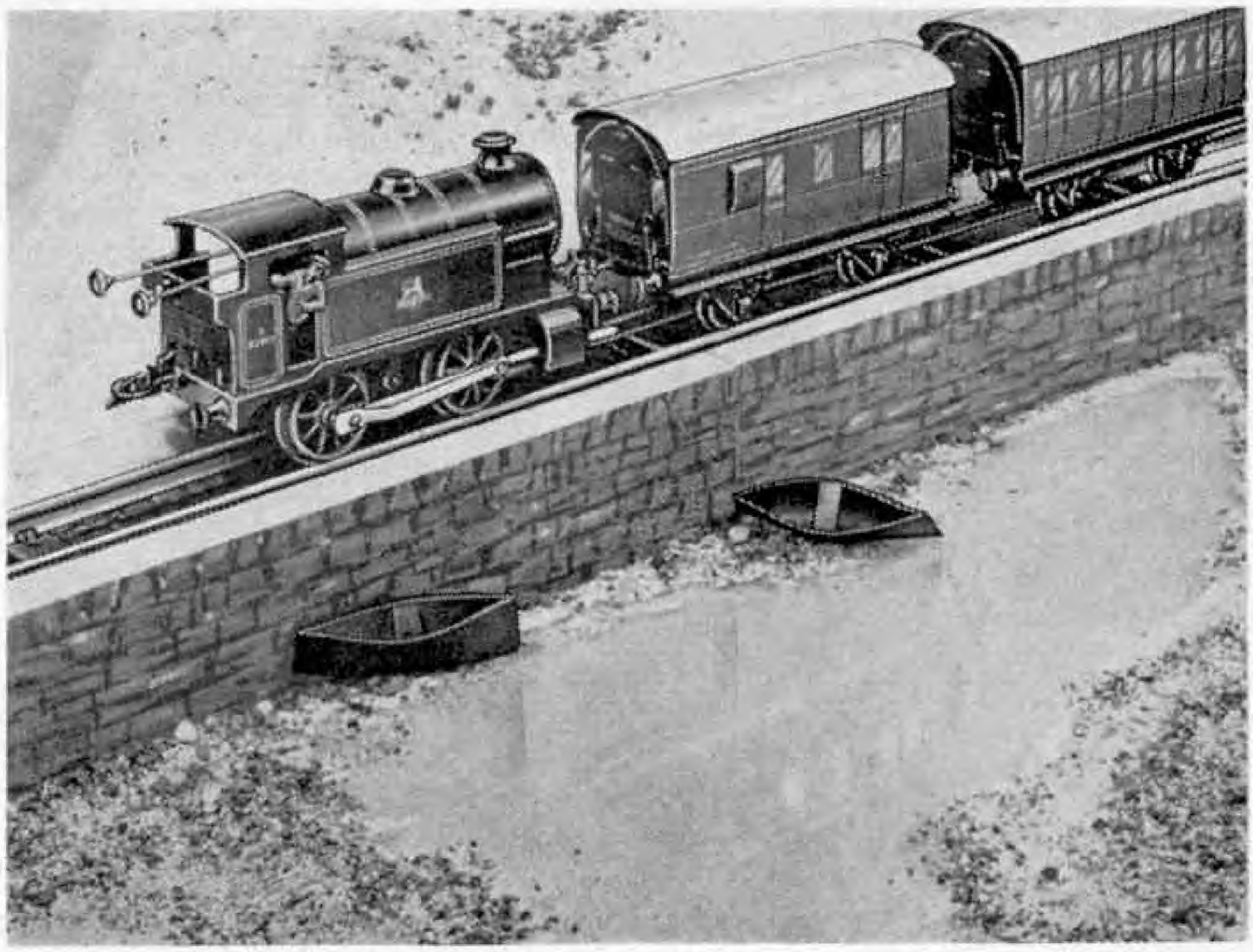
As a change from hustle and bustle, however, some enthusiasts like to fix up a less active scene and a good example is shown in the picture below. Whatever the subject of the "set piece," if we may call it that, attention to detail is called for if the result is to look natural. At the same time we should keep the scene as simple as we can, as excess of detail merely tends to confuse those who may see it. Developing the knack of deciding what to leave out takes time and usually a few try-outs or experiments are necessary before just the right touch is secured.

The scene below represents a track carried along a sea wall where the beach comes practically up to the railway's edge. There are examples of this sort of thing in real practice. Probably one of the best known, at least to railway photographers, is the W.R. main line near Dawlish.

The building up of a scene of this kind is fairly simple, but patience is required in order to secure a really satisfactory result. The foundation, as it were, of the whole scene can be a cloth, or perhaps a big sheet of not-too-stiff brown paper. This is laid over one or two lengths of wood, or even cardboard boxes and so on to form the raised "base" of the railway itself. In the scene below, the "edge of the sea wall" is really two lengths of wood suitably painted to represent stone blocks. The cliff effect behind the train is arranged by taking the base cloth, or paper, upward over a number of boxes built up to give a sloping effect. The beach with its pool left by the tide is easily arranged by using a piece of glass to represent the water, and small pebbles, sand and track ballast are spread round to give the "sea shore" effect.

Boats are easily made from fairly stiff paper, glued and painted and I expect that most of you have made little craft of this kind at one time or another.

Such scenes can be quite attractive and they can be used effectively for display or exhibition purposes.



A Hornby stopping train makes its way along the "sea wall" built up as described on this page.

Club and Branch News

WITH THE SECRETARY

A HAPPY NEW YEAR!

A very happy and prosperous year in 1957 to all members of the Guild and H.R.C.! May it also be a record year for these twin organisations, with more new members enrolled than ever before. This achievement will need the co-operation of every member in bringing into the fold at least one new member before the end of 1957. There is no better time than now to set about this, and I shall look forward to a steady flow of applications for membership of the Guild and H.R.C.

NEWS FROM INDIA

It always gives me special pleasure to have news of the activities of Meccano Clubs in distant lands. As it was quite a while since I had heard from the two Meccano Clubs in India—the Mysore and the Kota (Rajasthan)—I was delighted recently to receive long letters from both of them; these are summarised elsewhere on this page. Although both Clubs are quite young, as Meccano clubs go, they have already made their mark with some very fine displays at local exhibitions, and the high standard of Meccano model-building attained has won much praise from the great number of visitors.



Geoffrey Steward, the Secretary of the H.R.C. Branch of the Kidderminster Model Club, is—as he should be!—a very keen model railway enthusiast.

MECCANO CLUBS RECENTLY AFFILIATED

Hodder Place (Stonyhurst) M.C.—*Leader:* Rev. A. Powell, S.J., Hodder Place, Stonyhurst Preparatory School, via Blackburn.

County Secondary School (Stourport-on-Severn) M.C.—*Leader:* Mr. S. H. Middlemiss, County Secondary School, Stourport-on-Severn.

H.R.C. BRANCH RECENTLY INCORPORATED

No. 562, County Secondary School (Stourport-on-Severn)—*Chairman:* Mr. S. H. Middlemiss, County Secondary School, Stourport-on-Severn.

Model-building continues to occupy an important place in Club activities. The Annual Fete conducted by the Parent's Committee was a great success, and it is expected that the Building Fund will benefit by well over £100. Club roll: 48. *Secretary:* W. Miles, 6 Piaggio Street, Bayswater, Perth, Western Australia.

INDIA

Kota (Rajasthan) M.C.—Two 3-day Exhibitions were held last year, one in the Government Degree College, Kota, at the request of the Principal, and the other in the Government Multipurpose Higher Secondary School, Kota. A series of splendidly-built, power-operated models was the main feature of the displays. These models included a mechanical excavator, a steam marine engine, an automatic biscuit machine worked on the "penny in the slot" principle, a tramcar and a locomotive. Club roll: 10. *Secretary:* Mr. Hari S. Chablani, House No. 4/300, Kota (Rajasthan), India.

Mysore M.C.—The Club have moved into a larger room, and have added Table Tennis to the games programme. As usual the Club took part in the annual Mysore Dasara Exhibition, which was larger even than last year's, then a record. They staged a fine display of working models, had a large Hornby-Dublo layout in operation, and photographs and pictures of scientific and engineering interest, and other hobby displays. *Secretary:* M. N. Radhakrishna, 1096, Chamaraja Puram, Mysore City, India.

SOUTH AFRICA

Cape Peninsula M.C.—An annual group competition produced some good models, and two groups of members tied for first place with excellent models of a Meccano loom and a Meccanograph respectively. The Club took part in the annual Hobbies Fair, their impressive display including several big working models. Club roll: 23. *Secretary:* P. B. Simpson, "Sherwood," Newlands Road, Claremont, Cape Province, Union of South Africa.

CLUB NOTES

Mile End (Portsmouth) M.C.—Work on a Meccano elevated railway structure for the associated H.R.C. Branch is making good progress, the Branch members helping in this job. Variety is given to the Club programme by Games Nights and Film Shows. A surprise visit by an ex-member now serving in Germany was welcomed, and he gave an interesting talk about the railways in that country. Club roll: 30. *Secretary:* Mr. A. J. Nicholson, 213 Sultan Road, Buckland, Portsmouth.

AUSTRALIA

Maylands M.C.—Two new features have been added to the Club programme—Bookbinding and Woodwork—and good results are being achieved.

BRANCH NEWS

Newport C. of E. Junior Boys' School (I. o. W.)—With the co-operation of the Parent-Teacher Association improved accommodation has been made available to the Branch, and a semi-permanent layout has been constructed. It is planned to add scenery as soon as possible. *Secretary:* P. Keeley, Newport C. of E. Junior Boys' School, West Street, Newport, Isle of Wight.

Mile End (Portsmouth)—The Branch track, rolling stock, etc., have been thoroughly overhauled. Experiments with different layouts are being carried out. The elevated railway being built by the members of the associated Mile End M.C. will greatly enhance the appearance of the Branch layout. *Secretary:* Mr. A. J. Nicholson, 213 Sultan Road, Buckland, Portsmouth.

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For other Stamp Advertisements see also pages 48 and xvi

Stamp Collectors' Corner

By F. E. Metcalfe

ECONOMICAL COLLECTING

Before I deal with the very popular KGVI group of stamps, or collections based on themes, I would like to comment on other popular groups of stamps for the benefit of young and old who, for various reasons, do not want to have to spend a lot of cash on the hobby.

A collection of our Commonwealth classics, the older colonial issues, is a joy to behold, but these stamps have been pushed up so far in price that they are quite beyond the reach of ordinary folk. That, I am afraid, disposes of the classics of Commonwealth and of foreign countries alike.

There remain the modern stamps, not by any means inferior in design or appearance in many cases, even if they do lack the appeal that old things, be they stamps or furniture, have for us. Anyhow, there is nothing wrong from any point of view in a nicely mounted collection of used commemorative stamps, of say Brazil, U.S.A. or a score of other countries. It may be a bit more difficult to gather the stamps of Brazil than those of the U.S.A., but referring to my own small collection, I have spent very little on it, and the extra difficulty in finding the stamps added to the fun.



U.S.A. commemoratives are about in bushels. All are illustrated in Gibbons Simplified catalogue, and if you will go to the trouble to read up the events depicted on the stamps, then indeed you will be getting a great deal out of your collection in the way of education, if you don't mind that.

For an inexpensive and attractive mint collection, modern France cannot be beaten. Not long ago, as I stood in a stamp shop in London I saw a young schoolboy spend about four shillings on French pictorials. As he was paying, I picked up the stamps he had bought and examined the designs. They were nothing short of glorious. They were also a triumph of the art of printing, for though they were line engraved they had almost all the softness of photogravure printing.



Swiss stamps are fairly popular. But while the moderns are colourful enough, they are not exactly my cup of tea, for to me they seem to lack the quality that so distinguishes the line engraved stamps of France. Technically they are almost perfect, but for the reason I have given, you can have my share.

After the war a lot of "Hitler" issues, as they were described, came over from Germany. While they enjoyed an ephemeral popularity as novelties, they soon fell out of favour. With such big stocks of mint in dealers' hands, they are never likely to come to very much, which means that they are cheap enough to buy, even yet. Used are much scarcer, and if there are any who would like to collect this group, they should go after the stamps in the latter form.



Very popular groups with British collectors are the Dominions, that is Australia, Canada, New Zealand and South Africa. For the latter a particularly deep pocket is not needed to finance a nice collection of used, but one needs to know a good deal about stamps in general, and South African issues in particular, before one can cope successfully with all the shades and plate differences. My own collection of mint was gathered as the stamps were issued. Although it dates only from 1937, there are scores of stamps in it, but it is one of my favourites. The only snag is that the joined pairs come adrift so easily.

Australia, ignoring the States, is another country that does not go back very far, but like South Africa, there is a wealth of material for the philatelist in it. But I would suggest a used collection from the beginning of the KGVI reign. This would not be expensive, but would be well worth the trouble.



Canada is perhaps the country with the greatest possibilities. The earlies are only for the rich man but, starting from about 1912, it will not be difficult to gather a nice little lot of used together for a quite small sum. But the centering of Canadian stamps is often bad, so watch this point very carefully, and avoid those heavy cancellations.

And then we have New Zealand, more colourful as far as the commemoratives are concerned and grand to collect. If I were asked which is the finest set of stamps ever issued by any country, I would consider giving the palm to the pictorial set of 1935 of New Zealand. It has everything. Just look at that 2½d. stamp, and the 3/– value for sheer beauty. And then examine some of the other values for interesting subjects, and with perforation varieties, etc., one has a load of pleasure searching for some of them.

Stamps of New Zealand that are not popular are those known as the "Arms" type. They are classified as postal-fiscals, which means that, as in the case of our own stamps, they can be used for revenue as well as postal purposes. They go to a top face value of £50, but only stamps up to £5 are catalogued, as it is thought that stamps above the latter figure are not used postally. This idea is due for revision, however, for with the expensive postal air rates, £10 stamps are used frequently. Anyhow the stamps are relatively cheap, and all in all, New Zealand modern stamps are well worth gathering.

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For other Stamp Advertisements see also pages 46 and xvi

Stamp Gossip

UNION

I am asking the Editor to illustrate what is to my mind a very interesting stamp issued by Belgium on 15th September last. In June a conference was held at Messina by the countries that make up the European coal and steel community, and the members took the view that all possible should be done to further more collaboration by the various European States. Later in July a sub-committee was formed to study measures to promote the development of co-operation in postal and telegraphic communications. One of the recommendations was that the various countries represented should issue postage stamps, with a common design, that would symbolize this.



The design of a Frenchman, M. Gonzague, was chosen. This depicts an edifice in which the stones in front form the word Europa. In the background the flag is supposed to form the letter E, but unless I am a bit too dense to spot it, this appears to me to be a bit far fetched. Still, the stamp with its implications is of great interest, and bit by bit we really seem to be getting somewhere as far as co-operation is concerned, and how we do need to make such progress!

POPULAR U.S.A.

Although there is only room to illustrate a few stamps each month—the whole of each issue would scarcely be big enough to show every stamp issued—and U.S.A. stamps are often selected, if more than a month or two passes without one being shown, I get quite indignant letters, so popular are the postage stamps of the great Western republic. Well, I need no prompting to select the American Labour Day stamp for showing, for in my humble opinion the design is magnificent. And don't forget the stamp is line engraved, which means quite a job to print the three hundred millions of stamps that will be needed.



Uncle Sam has issued one or two very moderately designed stamps, as have most countries, but I think that most people will be satisfied with this one. I certainly am, and with the many stamps depicting various phases of past and present American life that have been issued during the past few years.

POSTER STAMPS

If collectors wish to gather those quite attractive stickers known as poster stamps, they are perfectly entitled to do so. But they must be warned that while sets apparently cost as much as many equally attractive sets of officially issued postage stamps, their re-sale value will in my opinion be almost negligible. So if you are prepared to consider any money spent on these labels as lost, and still want to buy them, go right ahead. But it is postage stamps only for me.



WHY SO UNPOPULAR?

Some time ago, a dealer I know wanted to buy a few sets of the current New Hebrides issue, to send to the U.S.A. The wholesalers he approached could not supply these. They all answered that this Condominium was most unpopular with collectors, and as there is nothing in its philatelic history to annoy anyone, I cannot understand why.

Anyhow, the new commemorative set of four values, issued on 20th October to commemorate the 50th anniversary of the joint ruling of this territory by Britain and France should be popular enough, for not only is it inexpensive at about 2/6, but its two designs should appeal to thematic collectors. One of these is illustrated. The other shows Britannia and Marianne. Let us hope that this set will bring more popularity to New Hebrides stamps.



THE REGIONALS

In spite of the fact that the projected stamps for Scotland, Wales, etc., have been given wide publicity, many people wonder what it is all about. So perhaps I had better mention the stamps, for they should be out by the time these lines appear, or soon after.

Briefly, many have been asking for pictorial stamps of Britain. All kinds of reasons have been given why we should have them, the principal one being that they would attract visitors to our country. A few months ago Lord Elibank made a strong appeal in the House of Lords for such stamps and in reply the Government trotted out the hoary excuses they bring out every time new stamps are suggested.

But the appeal had been so forthright, and there had been so much support for it, that the Post Office was at last shaken out of its apathy, and shortly afterwards it was announced that 2½d. stamps for the Channel Islands and the Isle of Man, and 2½d., 4d. and 1/3 stamps for Scotland, Northern Ireland and Wales were to appear. Let us hope that regular issues of commemorative stamps will follow.

THE MONTH'S TIP

The watermark of British stamps up to a face value of 1/6d. has been changed, and gradually the stamps overprinted for Bahrain, etc., are also undergoing similar changes. So I would urge that these overprinted stamps of the QEII issues with the old Tudor Crown watermark should be picked up at once. They will never be as cheap again.

A 42-ton Transmission Shaft—*(Continued from page 5)*

continuous hot strip mill. From the stockyard they are charged into one of three reheating furnaces, each capable of heating 60 tons of slabs an hour. As each slab is fed in, a white hot slab is pushed out of the furnace at its far end, falling on rollers that carry it to the hot strip mill, in which it is reduced to about a tenth of an inch in thickness. Through one set of rolls after another the growing strip passes, becoming longer as it is reduced in thickness until it is a long ribbon of steel, which finally is rolled up into coils weighing four or five tons each.

The steel strip is then "pickled" in acid baths to clean its surface and remove scale before being further reduced in thickness by passing it through a train of cold reduction mills, and coiling it up again. Then it is next treated in annealing furnaces to restore its ductility, passed through a skin pass or temper mill, inspected and packed for shipment.

Quite a lot of the output of Summers ends as motor car bodies. The strip is also used for making oil drums and other containers, kitchen furniture, office desks, cabinets, cookers, refrigerators, galvanized sheets and countless other well known things.

Among the Model-Builders—*(Cont. from page 37)*

notice recently by Mr. J. Grieve, Department of Surgery, Queen's College, Dundee, who has used Meccano parts to build up a kind of roller drum arrangement for use in laboratory work. The apparatus shown in Fig. 3 on page 37 was used by Mr. Grieve and Dr. John Macdougall of the Anatomy Department in tissue culture technique.

As will be seen the apparatus takes the form of a drum, the ends of which are Hub Discs, and is designed to carry eight test tubes holding the tissue for culture. These are held in place by rubber bands. The drum is slowly rotated by an electric motor and by means of a screw arrangement it can be tilted slightly so that the tissue in the tubes is covered with nutrient fluid once during each revolution of the drum.

This Meccano version was based on a conventionally constructed machine used by Dr. Szebo, University College, London.

Worlds that Vanished—*(Continued from page 15)*

water rushed in, taking the King, Mordred and all his men beneath the sea.

The most famous sunken land, whether it is real or not, is that of Atlantis. This, it is thought, was a vast island continent situated between America and Europe in the Atlantic Ocean. This huge piece of territory, so legend claims, vanished when the Great Flood drowned the world, and it never emerged when the waters retreated.

Whether Atlantis is real or not, its probable existence was discussed some 350 years before Christ, and some 2,500 books and articles have been written about it. It is mentioned by Plato in his dialogue entitled *Timaeus*, which he wrote about 2,300 years ago. He said that a large island existed in the ocean opposite the Pillars of Hercules, and it was such a large island that it was ruled by no less than twelve kings.

The Antlanteans were larger in build than the rest of mankind, and they raised temples, palaces, ships and harbours that were equal to anything to be found in the rest of the world. They imported goods from many lands, dug precious metals out of the earth, trained animals, and were so highly civilized that they did not use the death penalty to punish those who broke the law. In fact, they lived together in peace, but that did not prevent them from attacking other lands. They invaded Greece, it is said, but were defeated by the Athenians.

All these things are claimed for Atlantis, but is there such a vast territory lost beneath the Atlantic Ocean?

For years, scientists have discussed the idea, and even today they are not certain. Nevertheless, several famous men have been quite sure that Atlantis is more than a legend. One of these was the late M. Pierre Termier, of the Geological Chart of France, who said that Atlantis was a land-mass representing the last spurs of a European chain of Alps.

Other famous men who have shared this belief are Professor J. W. Gregory, Sir J. W. Dawson and Professor R. F. Scarff. Biologists, too, think that Atlantis might well have existed, acting as a land link between America and Europe. It is not easy to sort out the truth from the legend, but it is known that the Earth's surface has suffered many large upheavals. Land long submerged has been raised clear of the water, and land has disappeared. It is a fascinating study trying to find just where the lost worlds now lie.

"TRAINS ANNUAL"
Edited by CECIL J. ALLEN
(Ian Allan, 10/6)

"LOCOSPOTTERS' ANNUAL"
Edited by G. FREEMAN ALLEN
(Ian Allan, 6/-)

"TRAINS ANNUAL," always eagerly awaited, makes its eleventh appearance, with the usual choice selection of subjects in its different sections. Railways to Ilfracombe, the routes of the North Eastern area and the railway road to the Isles are among the topics dealt with. Other attractions are stories of roundabout railway routes and the peculiarities of rail travel on them in Great Britain, and a closely interesting study of British main line train services of 50 years ago.

Illustrations are plentiful. The "Irish Mail" in colour on the jacket is good, but the colouring of the Royal train pictured in the frontispiece is not quite so attractive.

"LOCOSPOTTERS' ANNUAL" is good value at the price. The first section will be very welcome to out and out steam spotters, and they will have little to complain about in the subsequent pages, which are more general in character. Their pictures and text recall the thrilling contest in the earlier years of this century between the G.W.R. and L.S.W.R. for the transatlantic traffic between Plymouth and London, the working of the Lickey Incline, and B.R. 10 coupled engines, more particularly those fitted with Crosti boilers, and many other interesting railway topics, and there are plenty of pictures that will appeal to the enthusiasts for whom the book is intended.

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Competition! Open To All Readers

Prize-winning entries in M.M. competitions become the property of Meccano Ltd. Unsuccessful entries in photographic, drawing and similar contests will be returned if suitable stamped addressed envelopes or wrappers are enclosed with them.

Which 1956 Cover Do You Like Best?



This month is the occasion for another of our popular annual Magazine cover competitions, in which we give readers the opportunity of telling us which of the previous year's *M.M.* covers they like best. The illustration above shows in miniature the twelve 1956 *M.M.* covers. These miniatures in black and white cannot give any idea of the brilliant colours of the originals, and their purpose is merely to remind readers of what the subjects were.

We invite each entrant to state on a postcard: A, which of the 1956 covers he likes best; and B, in what order he thinks the covers will be placed by the combined vote of the competitors. The covers must be referred to by the names of the month in which they appeared, and it is not necessary for a competitor to place his choice at the top of his list under the second heading.

There will be two sections, for Home and Overseas readers respectively, and in each prizes of 21/–, 15/– and 10/6 will be awarded for the best entries in order of merit, with consolation prizes for those who just fail to gain a main award.

The names, addresses and ages of entrants must be written on their postcards, which should be addressed to *1956 Cover Voting Competition, Meccano Magazine, Binns Road, Liverpool 13.* The closing dates in this Contest are: Home Section, 28th February; Overseas Section, 31st May.

Competition Results

HOME

MAY 1956 DRAW A DIESEL CONTEST

1st Prize, Section A: P. W. Bainbridge, Rochester; Section B: M. Dunnett, Chester-le-Street. 2nd Prize, Section A: R. Hudson, Warrington; Section B: P. G. Lower, Worcester. 3rd Prize, Section A: B. C. Chapman, London E.11; Section B: R. Wainwright, Nottingham. Consolation Prizes: D. Hutson, London S.E.6; G. Hird, Willerby; R. Taylor, Baillieston; G. Warner, Luton; T. Sutton, Cleckheaton; G. Redrup Chertsey; G. Brown, Glasgow.

AUGUST 1956 DRAWING CONTEST

1st Prize, Section A: R. Hubbuck, Petersfield; Section B: S. Macfarlane, Glasgow W.3. 2nd Prize, Section A: J. N. Walton, Stocksfield-on-Tyne; Section B: C. J. Dodson, Bramhall. 3rd Prize, Section A: R. Armstrong, Ware; Section B: C. Dorin, Croxton. Consolation Prizes: C. F. Coutts, Dumfries; R. J. Goffey, Liverpool 20; P. G. Lower, Worcester; D. Tapp, Brentwood; J. Lee, Birstall; A. Ewen, Ellesmere Port; G. Sankey, Barking; J. Grubb, Portsmouth. R. J. Hingston, Torquay.

OVERSEAS

MARCH 1956 CROSSWORD CONTEST

1st Prize: H. A. Kimber, Poona 1, India. 2nd Prize: J. A. Gattrutter, Sliema, Malta G.C. 3rd Prize: J. McCutcheon, Calgary, Canada. Consolation Prizes: P. H. Vincent, Ellerslie, New Zealand; B. L. Kisch, Salisbury, S. Rhodesia; F. Poldy, Hong Kong.

From Our Readers

This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

A Railway Long Meg

The train illustrated here is known to railwaymen as *Long Meg*, as it originates from the sidings of that name near Langwathby, on the L.M.R. Settle and Carlisle line. These are named after a druidical stone circle near Langwathby, known as Long Meg and her Daughters.

The train carries anhydrite to Widnes for use in making sulphuric acid, and the main byproduct of the process is cement. On its way to Widnes the train travels over the metals of seven pre-grouping companies or joint lines—M.R., L. and Y.R., L. and Y. and L.N.W.R. joint line, L.N.W.R., G.C.R., C.L.C., and the G.C. and M. joint lines. It is made up of continuously braked hopper wagons.

W. S. GARTH (Manchester).



Long Meg on the curve between Amberswood East Junction and Hindley South. Photograph by W. S. Garth.

Information at Large

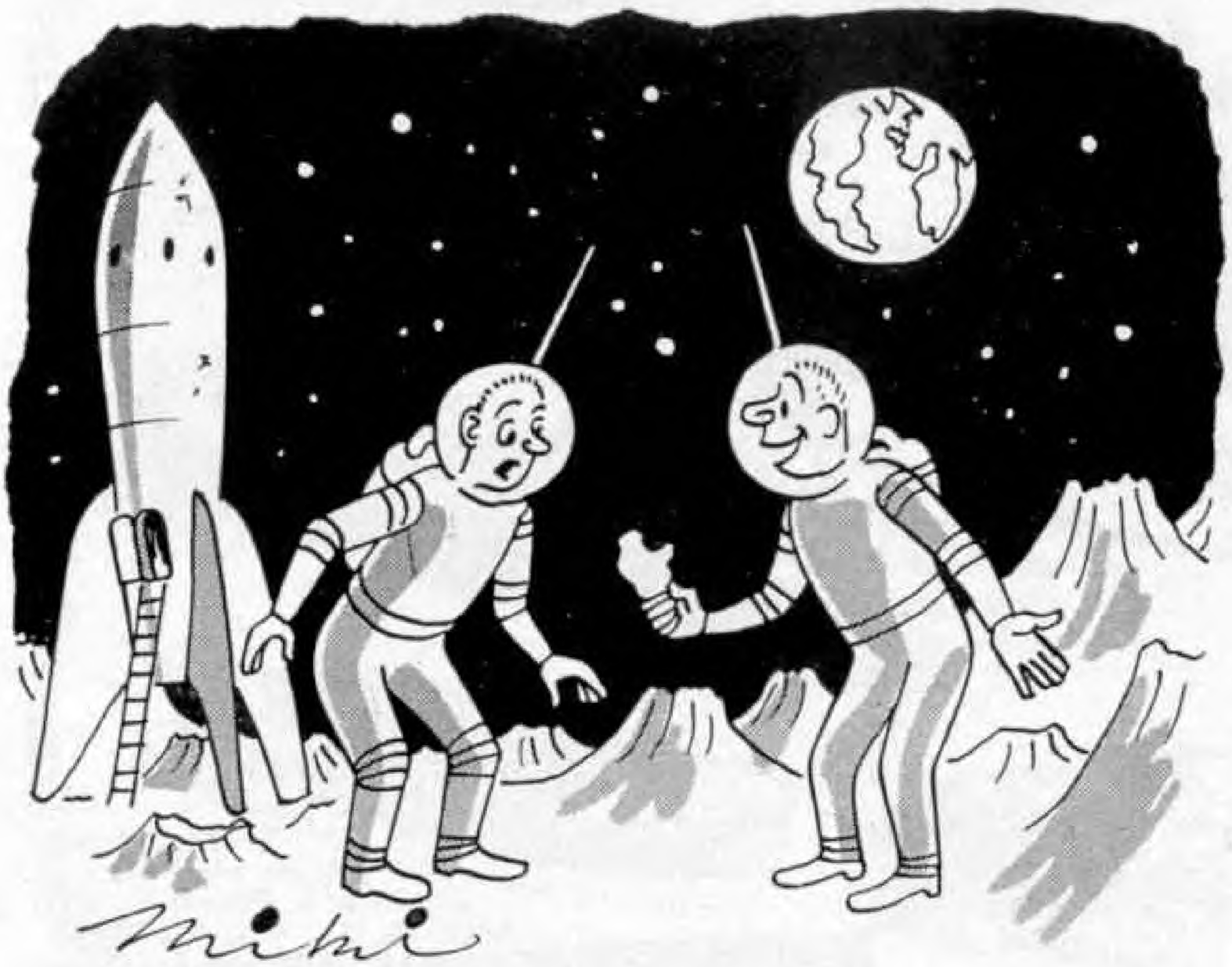
On the walls of Durlston Castle at Durlston Head, which forms the Southern headland of Swanage Bay, are two very interesting tablets. These are passed by hundreds of persons daily during the summer months on their way to visit the Great Globe and Tilly Whim Caves, which are the main attractions of Durlston Head. They tell the observer of differences in clock times round the World, with the length of the longest day in London, Hamburg and Spitzbergen and at the Poles, the last of these being six months in duration. Also one can read on them details of the convexity of the ocean and of the tides.

Both tablets are made of dazzling white stone and are fixed to the slightly slanting wall of the Castle. This is built of the fresh looking Purbeck stone that characterises the part of Dorset known as the Isle of Purbeck.

C. F. NEAL (London).



Tablets on the wall of Durlston Castle, Dorset. Photograph by C. F. Neal, London, whose son is standing in front of the tablets.



"Good heavens! It's treacle toffee."

Reproduced by courtesy of the Editor of "Hawker Siddeley Review."

Fireside Fun

Q.M.S.: "Where are you going?"
Private: "To fetch water."
Q.M.S.: "In those disreputable trousers?"
Private: "No—in this 'ere pail!"

* * * *

An employment officer, checking the references of an applicant for a job, asked one ex-employer: "Was he a steady worker?"

"Steady?" came the indignant reply. "He was motionless."

* * * *

Professor: "Er—My dear, what's the meaning of this vase of flowers on the table today?"

Wife: "Meaning? Why, today is your wedding anniversary."

Professor: "Indeed! Well, well, do let me know when yours is so I may do the same for you."

Be Warned!

Christopher was showing off his new bicycle. He went up the road, and on coming back shouted to his mother: "Look Mum—no hands!"

"Oh, be careful, Chris!" said his mother. "You'll hurt yourself."

Christopher laughed, and cycled up the road again. When he next appeared he called out: "Look Mum—no feet!"

Again the boy went off up the road, and it was some time before he reappeared. When he did, however, he called out, by no means so cheerfully: "Look Mum—no teeth!"

* * * *

Judge: "Guilty or not guilty?"
Defendant: "Not guilty."
Judge: "You ever been in prison before?"
Defendant: "No, this is the first time I ever stole anything."

* * * *

Prisoner: "What are you doin' guv'nor?"
Prison Visitor: "Just making a few notes."
Prisoner: "Golly—be careful. I was brought 'ere for doin' the same thing!"

* * * *

"What does your father do for a living?"
"He chops down trees."
"What does he do after he has finished chopping them down?"
"He chops them up."

* * * *

The teacher asked the class how Noah spent his time in the Ark. Getting no response from the children, she added, "Do you suppose he did a lot of fishing?"
"What?" jeered little Freddie, "with only two worms?"

BRAIN TEASER

FIVE MINUTE CROSSWORD

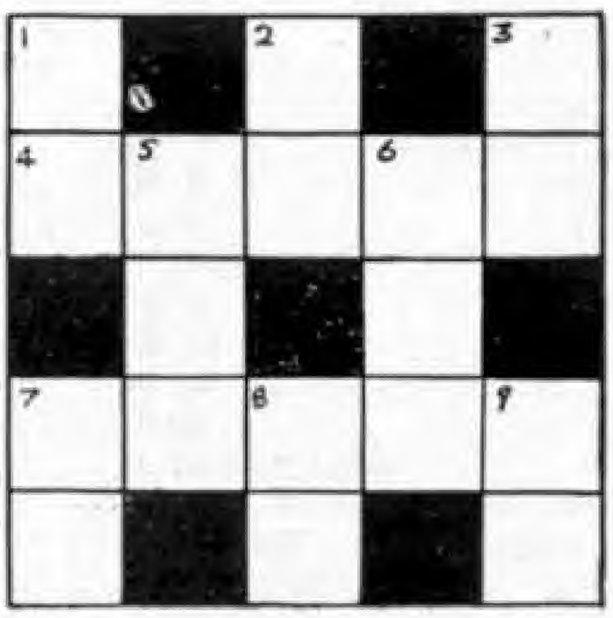
CLUES

Down

1. Not a sailing ship.
2. A hail.
3. Higher or aloft.
5. No bill with this.
6. A loud voice without its quiet beginning.
7. With to or not its a problem.
8. United Nations.
9. Double it is only so-so.

Across

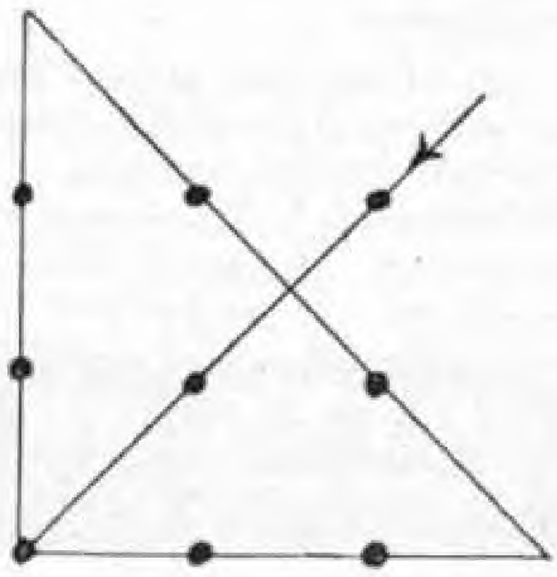
4. A Pressman's joy.
7. Fights.



ANSWERS TO LAST MONTH'S PUZZLES

Joining the Dots

The solution to the nine dots problem is shown in the sketch below.



Whatever Is It?

The solution to the poem puzzle is as follows:

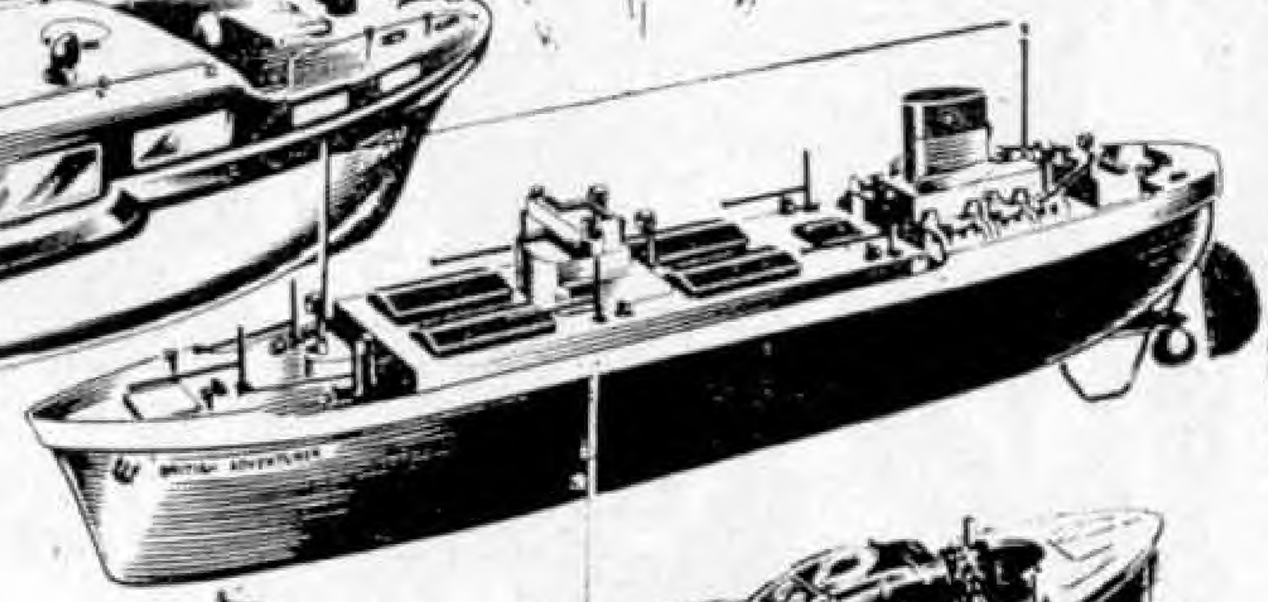
It was a summer's evening,
Old Kaspar's work was done,
And he before his cottage door
Was sitting in the sun.

See our stand

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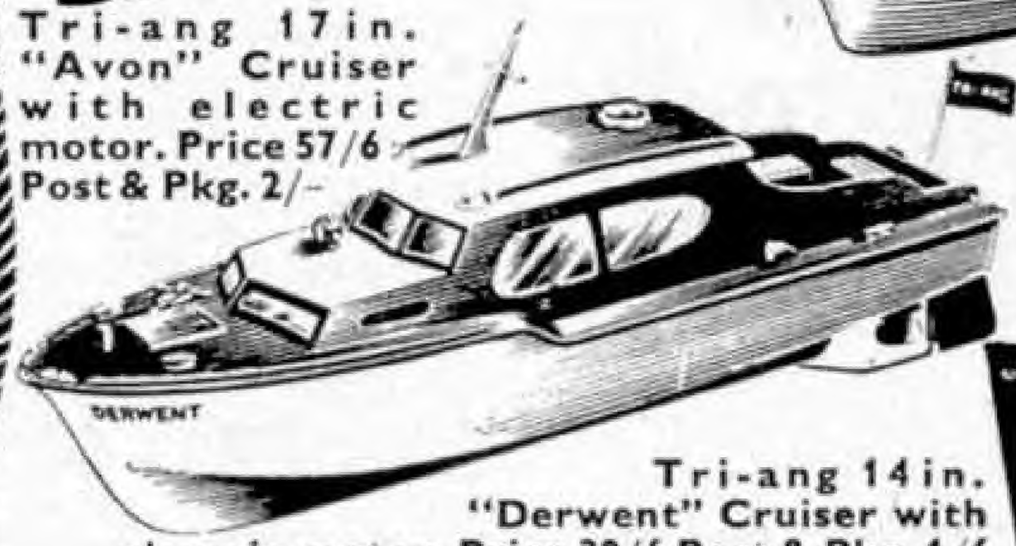




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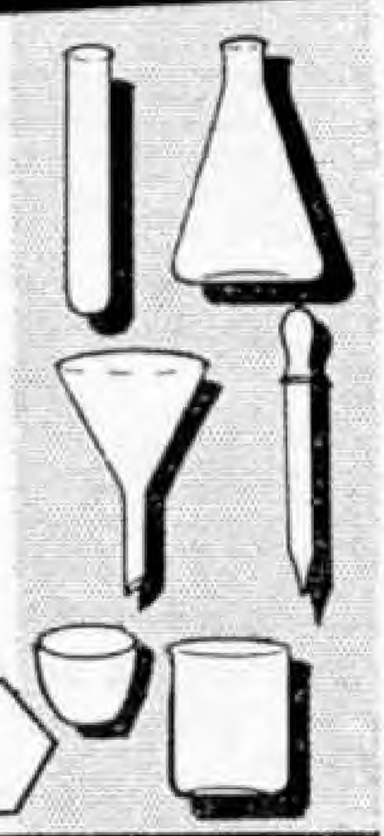
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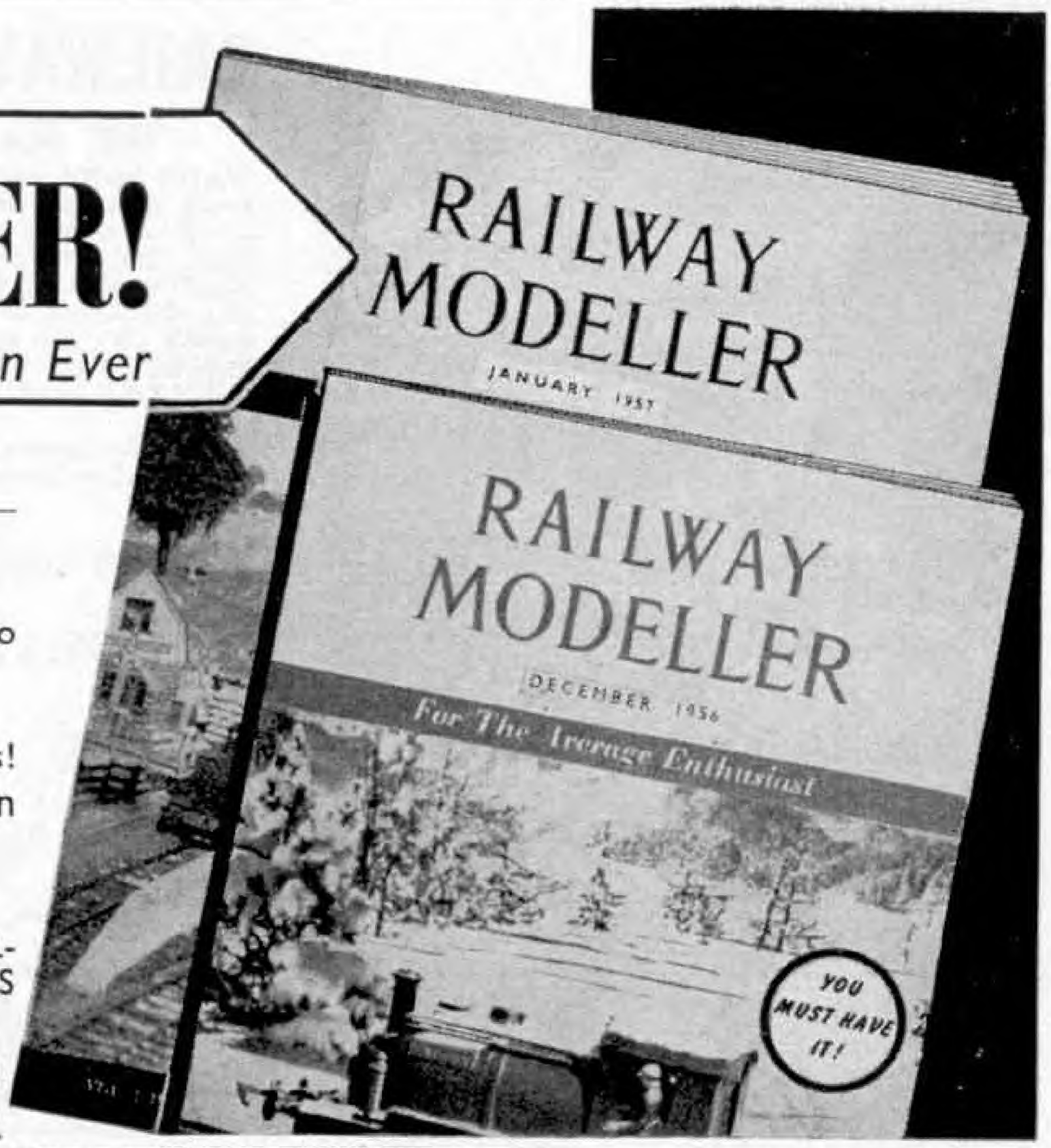
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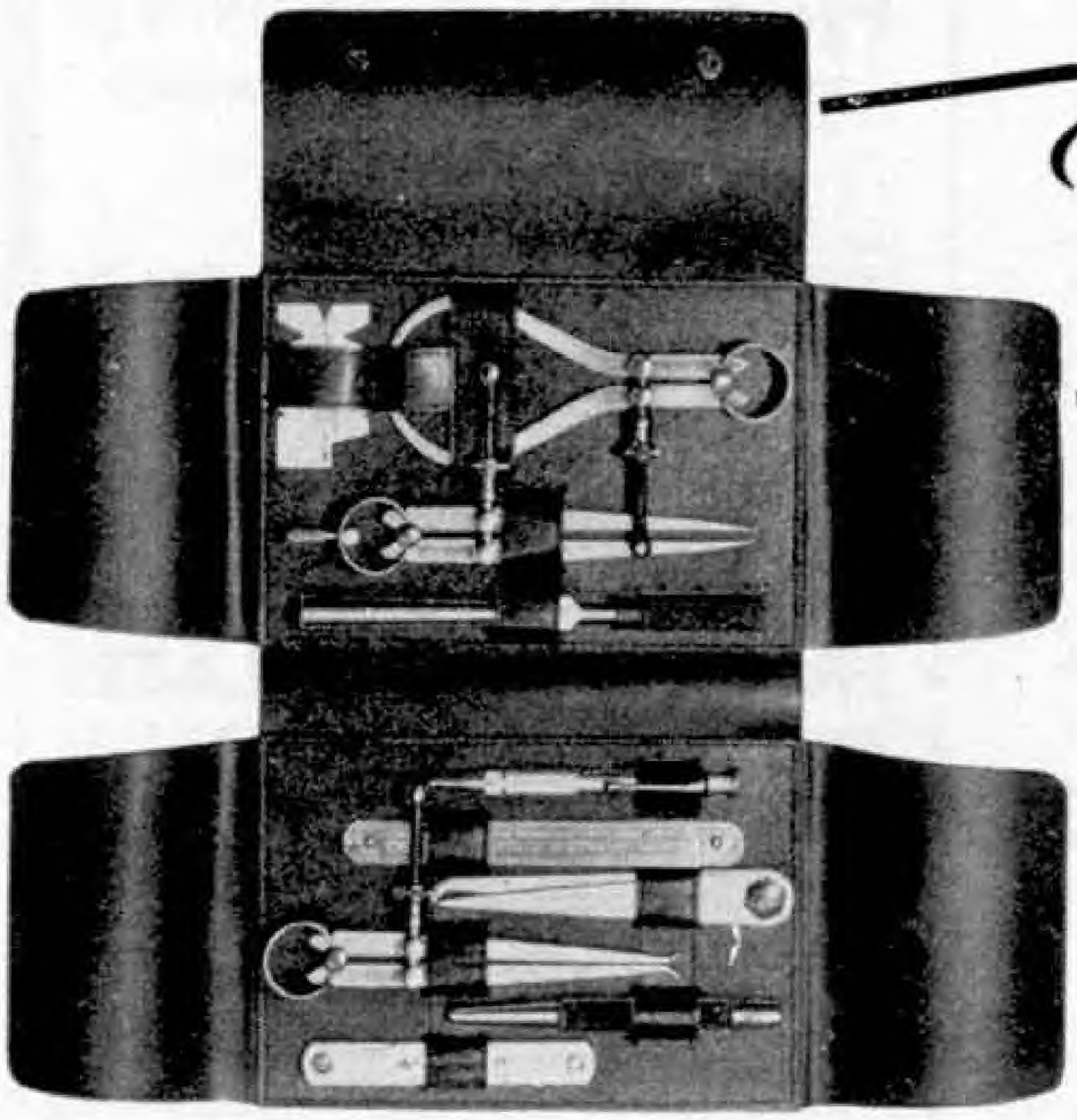
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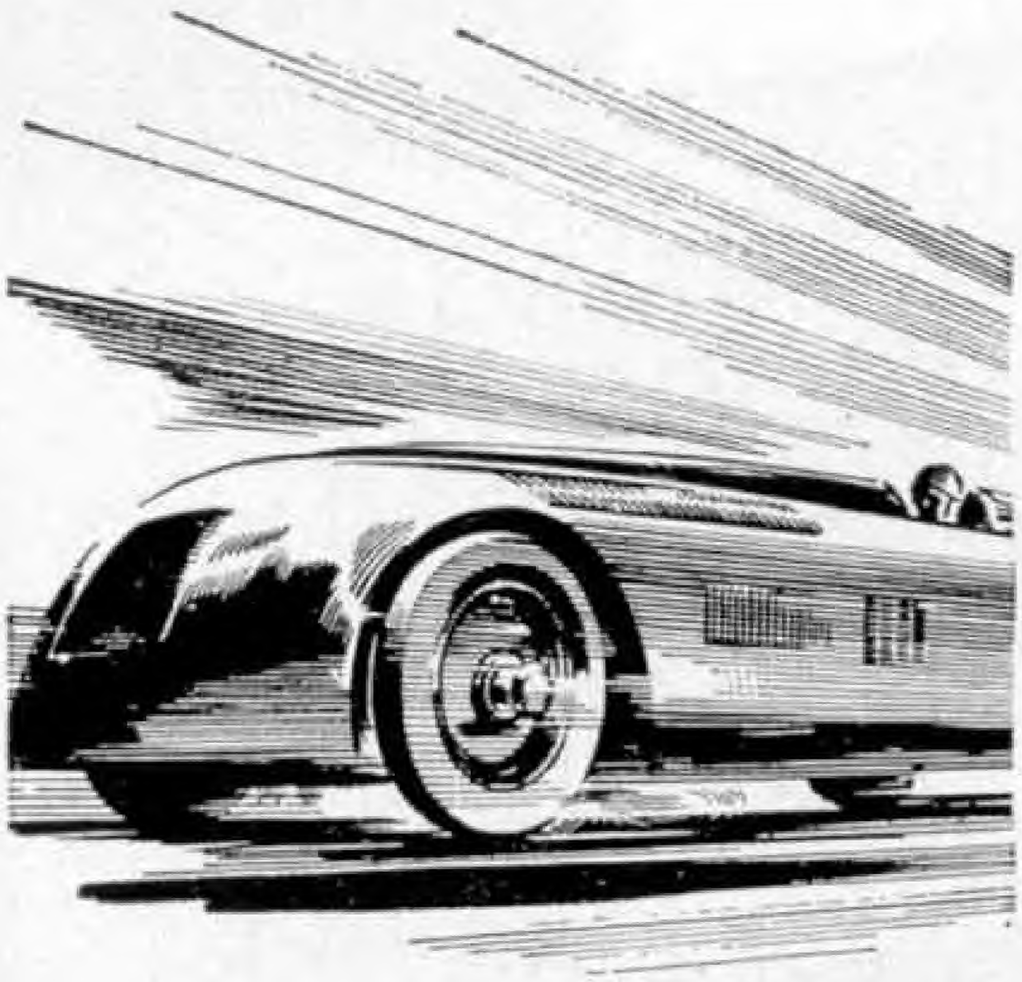
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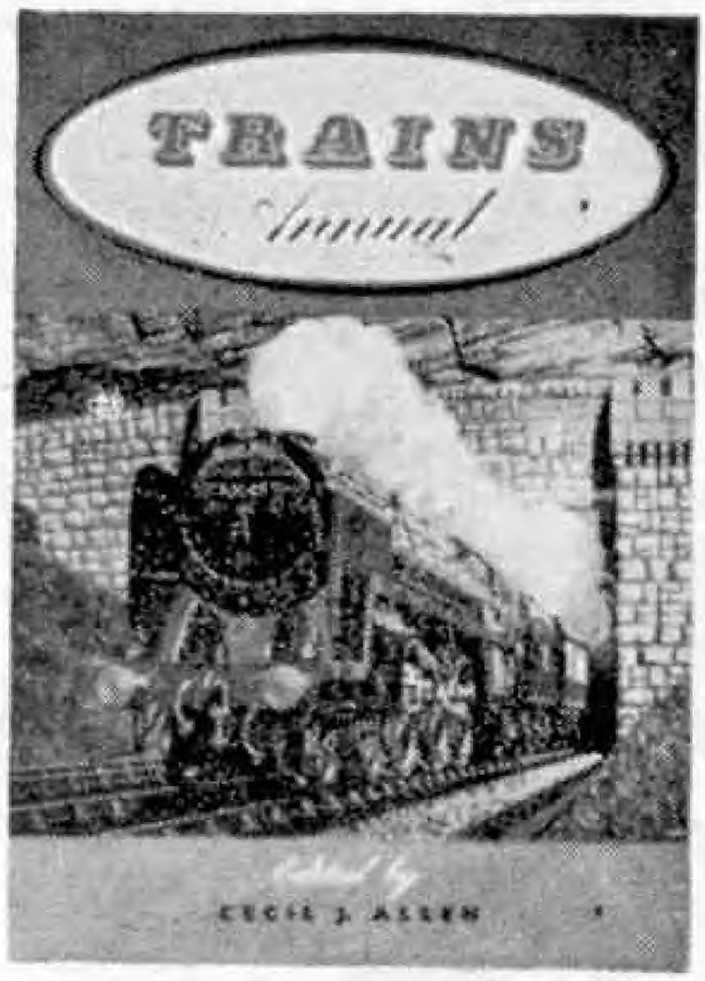
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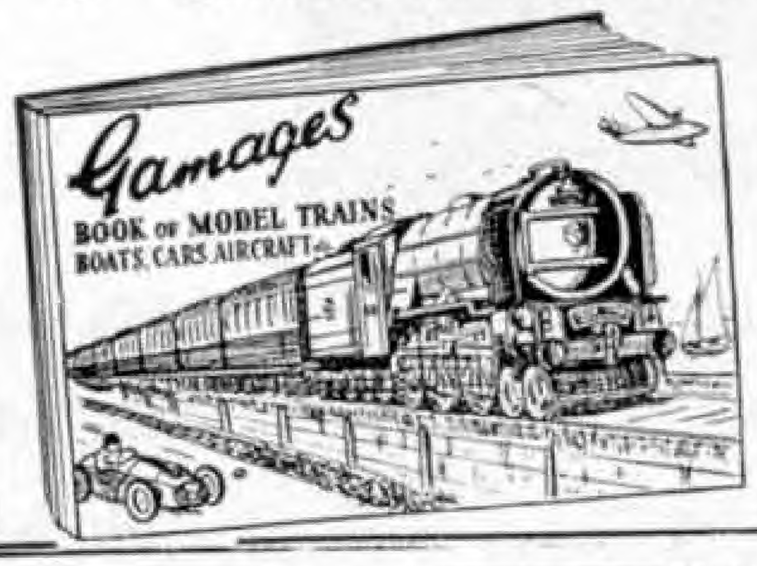
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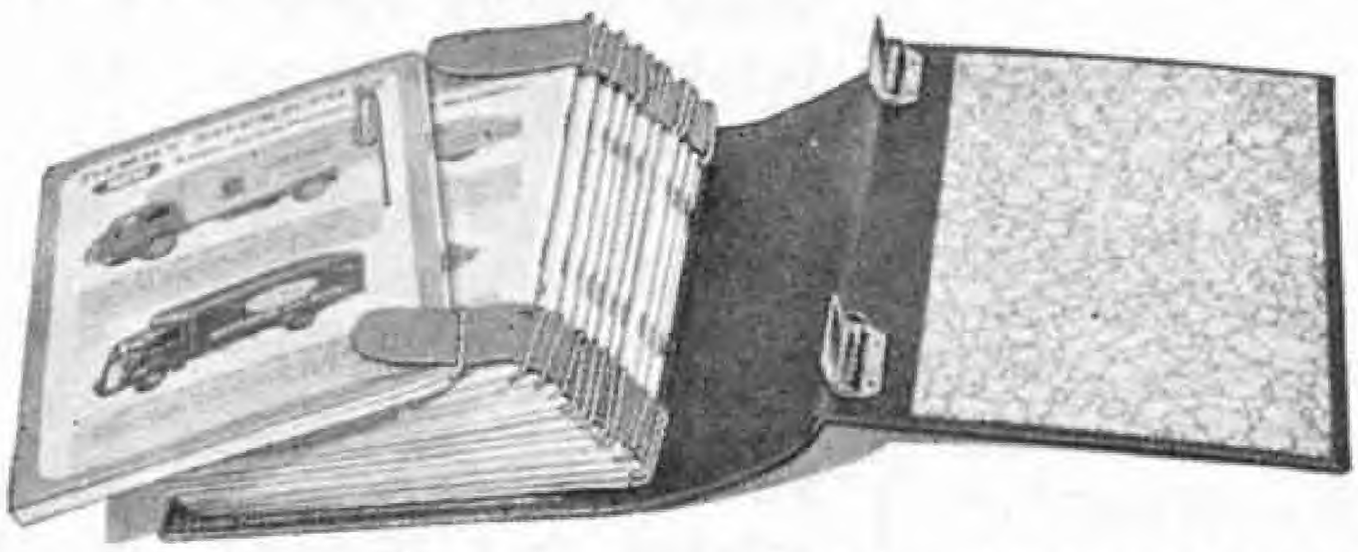
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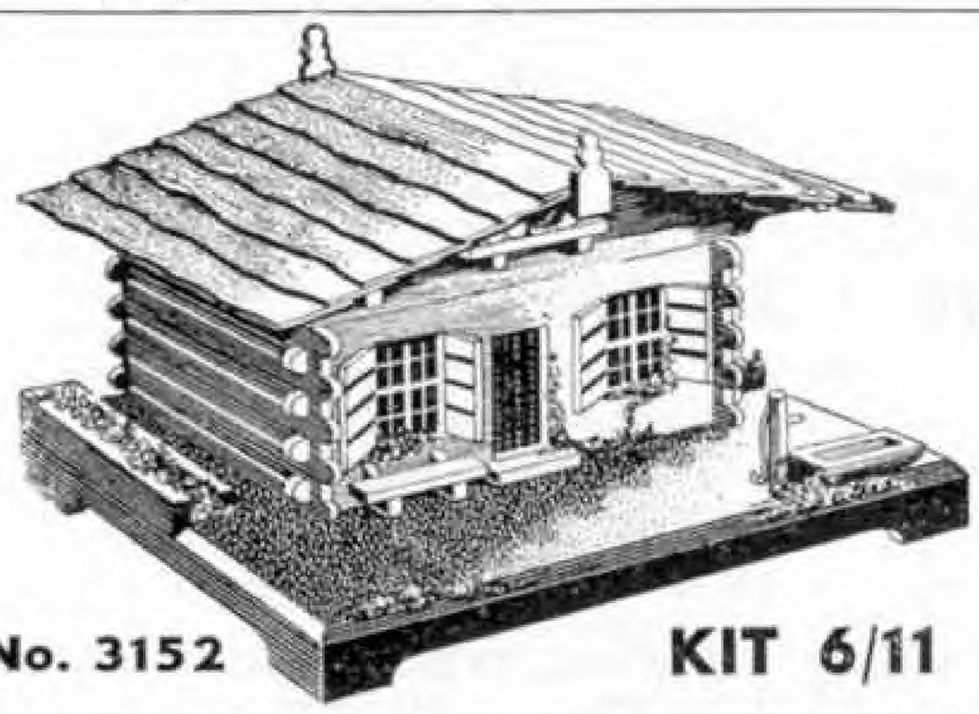
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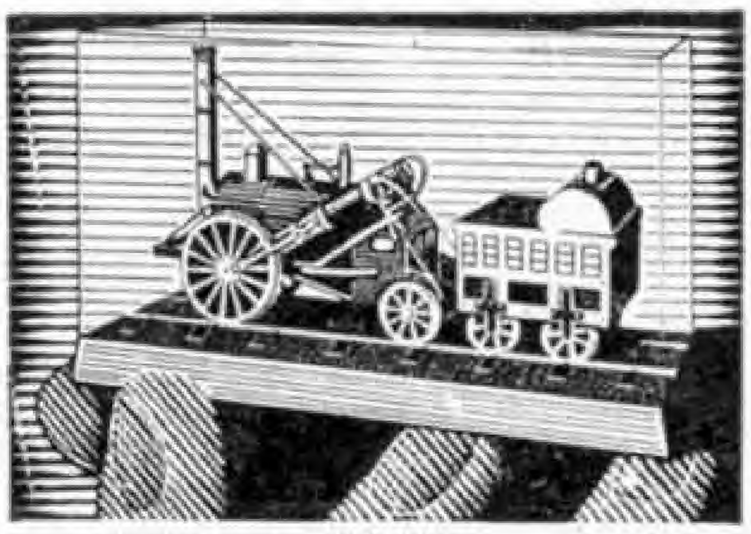
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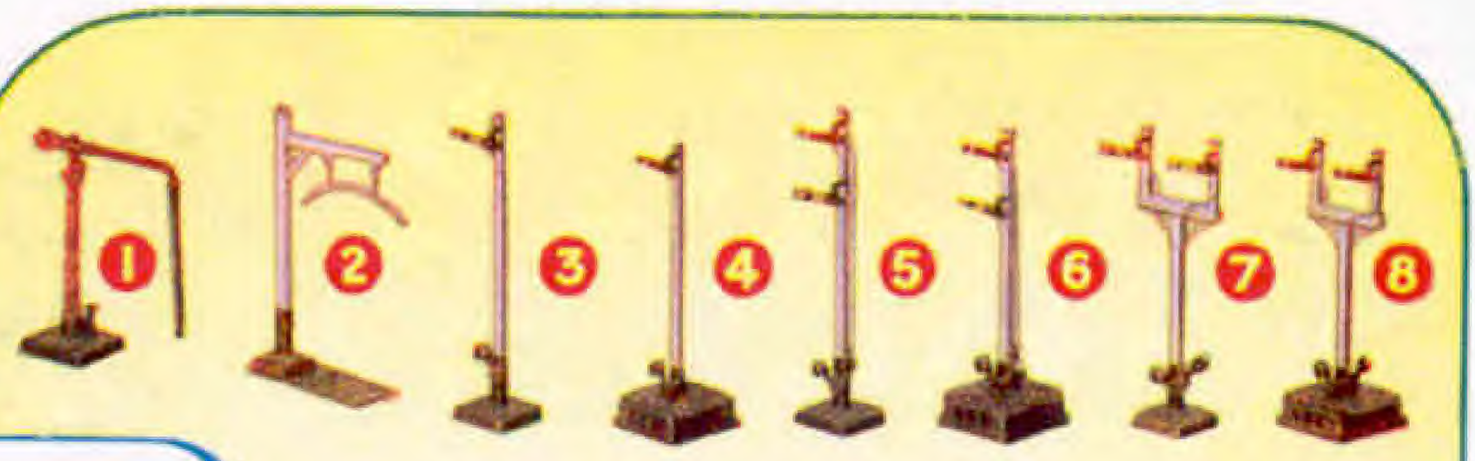
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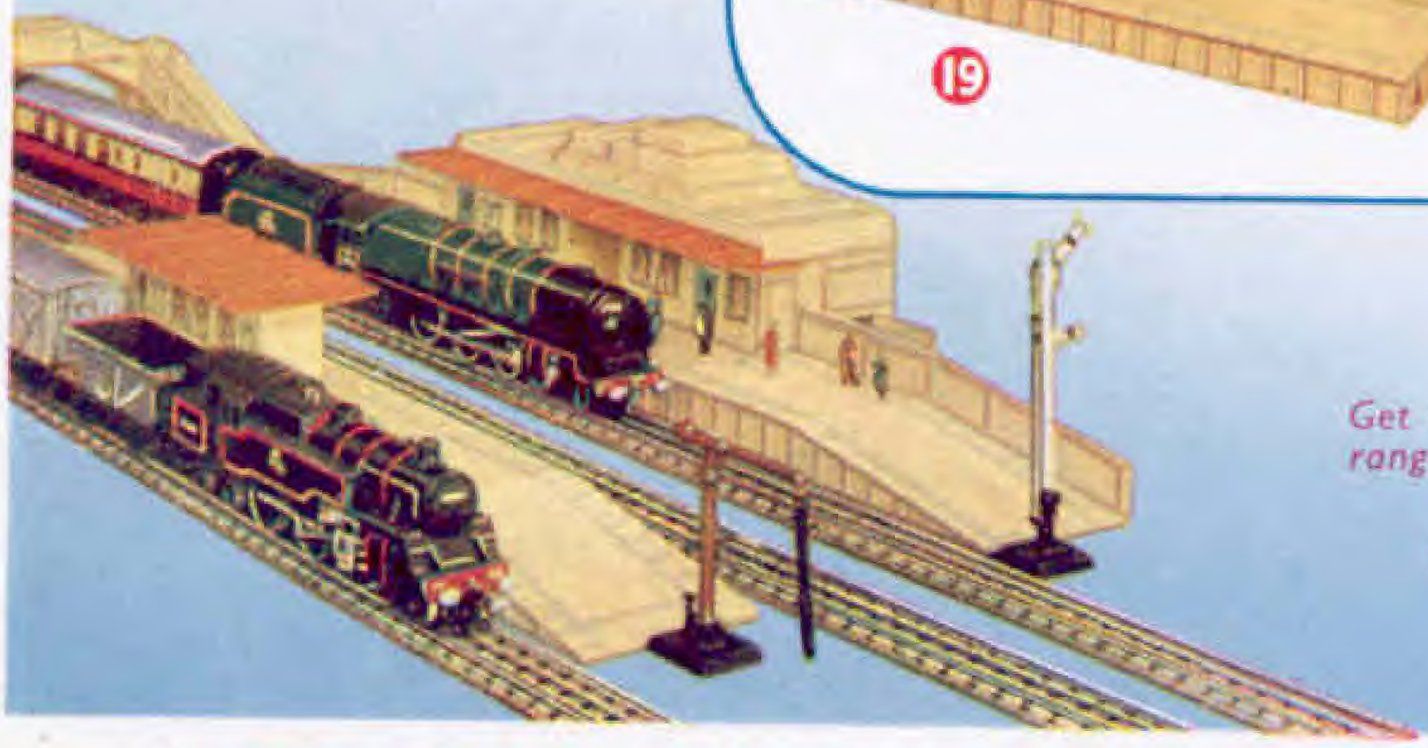




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MODEL OF THE MONTH

MOTOR CHASSIS.

Illustrated in the January 1957 Meccano Magazine.

Assembly of the Chassis Frame

The centre section of each of the chassis side-members consists of a $9\frac{1}{2}$" Angle Girder 1 and a $7\frac{1}{2}$" Angle Girder bolted to a $12\frac{1}{2}$" Flat Girder. The front end of the Flat Girder is bent slightly as shown and is strengthened by two $3\frac{1}{2}$" Angle Girders. A $5\frac{1}{2}$" Angle Girder 2 is fixed to the Flat Girder and the joint between them is braced by a 1" Corner Bracket. The centre section is extended at the rear by a $2\frac{1}{2}$" Curved Strip 3 and 4" Stepped Curved Strip 4. Two $2\frac{1}{2}$" Curved Strips that support a $5\frac{1}{2}$" Angle Girder 5 are attached to the Curved Strips 3 and 4. A $4\frac{1}{2}$" Strip is fixed between the upper flanges of the Girders 1 and 5.

The side-members are connected at the rear by a $7\frac{1}{2}$" Angle Girder 6 and a channel girder 7 made from two $7\frac{1}{2}$" Angle Girders. Another $7\frac{1}{2}$" Angle Girder 8 is bolted in position, and the front ends of the Girders 2 are connected by a $4\frac{1}{2}$" Angle Girder 9.

The side-members are braced by two girders 10, each of which consists of two $7\frac{1}{2}$" Angle Girders bolted to a $7\frac{1}{2}$" Flat Girder so that they overhang one end of it by one clear hole. The overhanging ends of the two girders 10 are connected by a $2\frac{1}{2}$" Flat Girder 11. The front end of each of the girders 10 is extended by a 2" Strip bolted to the Girder 2 and by a $1\frac{1}{2}$" Strip bolted to an Angle Bracket fixed to the lower front corner of the $12\frac{1}{2}$" Flat Girder.

A $4\frac{1}{2}$" Anglo Girder 12 is attached to each of the girders 10 by a 1" Corner Bracket and a $2\frac{1}{2}$" Strip. The Girders 12 are extended by $4\frac{1}{2}$" and $2\frac{1}{2}$" Strips connected by Anglo Brackets, and the $4\frac{1}{2}$" Strips are bolted to the chassis side-members.

The petrol tank is formed by a $2\frac{1}{2}$" x $1\frac{1}{2}$", a $5\frac{1}{2}$" x $1\frac{1}{2}$", two $5\frac{1}{2}$" x $2\frac{1}{2}$" and two $2\frac{1}{2}$" x $2\frac{1}{2}$" Flexible Plates rolled to form an oval cylinder and bolted together as shown. Each end of the tank consists of a Wheel Disc, a 3" Strip and two $2\frac{1}{2}$" Curved Strips bolted together. The ends are held in place by bolts screwed into Threaded Bosses attached to the Flexible Plates by bolts passed through them. The petrol filler pipe is a Crank Handle without grip and it is fixed inside the tank in a Collar screwed on to a bolt 13. The tank is attached to the girder 7 by two $\frac{1}{2}$" Bolts and to the Girder 6 by $1\frac{1}{2}$" Strips and Anglo Brackets.

Details of the Rear Axle and Springs

The rear axle casing should be assembled in two sections. One section consists of a Boiler End and a Face Plate connected by four $3\frac{1}{2}$" x $\frac{1}{2}$" Double Angle Strips, while in the other section four $2\frac{1}{2}$" x $\frac{1}{2}$" Double Angle Strips are used. A $6\frac{1}{2}$" Rod is passed through the larger section and on it a $1\frac{1}{2}$" Contrate is mounted freely. A $\frac{3}{4}$" Contrate 14 is fixed on the Rod, which is then passed into the long bore of a Coupling. A $1\frac{1}{2}$" Rod is fixed centrally in the centre cross bore of the Coupling, and is fitted with a Collar at each end. A 1" Screwed Rod is screwed into each Collar and is held in a hole in the $1\frac{1}{2}$" Contrate by two nuts. Two $\frac{3}{4}$" Pinions are mounted on Pivot Bolts and each of these Bolts is screwed into a threaded centre hole of the Coupling, so that its $\frac{3}{4}$" Pinion meshes with the Contrate 14. A $4\frac{1}{2}$" Rod is passed through the shorter section of the axle casing and a $\frac{3}{4}$" Contrate on it is arranged to engage the $\frac{3}{4}$" Pinions.

Motor Chassis

The rear axle is completed by connecting the Boiler Ends by means of four 2" Strips. One of these Strips supports s Double Bent Strip and is spaced from the Boiler Ends by three Washers on each Bolt. A $1\frac{1}{2}$" Rod mounted in the Double Bent Strip and the 2" Strip carries a $\frac{1}{2}$" Pinion that engages the the $1\frac{1}{2}$" Contrate. Washers should be placed on the Rods carrying the differential gears so that these gears mesh accurately.

The rear springs are formed by $7\frac{1}{2}$", $5\frac{1}{2}$", $4\frac{1}{2}$", $3\frac{1}{2}$" and $2\frac{1}{2}$" Strips, with Double Brackets bolted to the ends of each spring. The front end of each spring is mounted on a $\frac{3}{4}$" Bolt that is fixed by a nut in the chassis, and the Double Bracket is held on this Bolt by lock-nuts. The rear Double Bracket is lock-nutted to a Fishplate and a $\frac{1}{2}$" Reversed Angle Bracket, which are lock-nutted also to the chassis. The rear axle is attached to the springs by $1\frac{1}{2}$" Strips placed over the axle casing and connected to the springs by $1\frac{1}{8}$" Bolts.

Front Suspension and Steering Mechanism

Four 1" Corner Brackets, numbered 15 and 16, are bolted to two $1\frac{1}{2}$" Angle Girders fixed to each side of the chassis. The Corner Brackets 15 on each side are connected by two $2\frac{1}{2}$" Strips. On each side a Coupling 17 is pivoted on bolts passed through the Corner Brackets 16, and this Coupling supports a $1\frac{1}{2}$" Rod that carries a Swivel Bearing 18. A 2" Rod is passed through the "spider" of the Swivel Bearing. This Rod carries a Coupling 19, and it passes through another Swivel Bearing 20 and is held in place by a Collar. Swivel Bearing 20 is connected by a 1" Rod to a small Fork Piece, which pivots on a $\frac{3}{4}$" Bolt lock-nutted in a Double Bracket bolted to the chassis. Three $7\frac{1}{2}$" Strips 21 placed face to face are fastened to Coupling 17 by a bolt and their rear ends are bolted to the chassis.

A Rod and Strip Connector is placed over the lower end of each of the 2" Rods, and is linked by a 3" Rod to another Rod and Strip Connector bolted to the chassis. One of the 2" Rods carries a Crank 22 and the other is fitted with a Bell Crank 23. These Cranks are connected by a $6\frac{1}{2}$" Rod held in Swivel Bearings, which pivot on $\frac{3}{8}$" Bolts.

The front wheels are 3" Pulleys fitted with two Semi-Circular Plates, with Conical Discs clamped by the heads of the bolts passed through them. These bolts secure also Wheel Flanges that form the brake drums. Each Wheel is mounted freely on a $1\frac{1}{8}$" Bolt. Two Semi-Circular Plates are fixed on the Bolt by two nuts, and the Bolt is then screwed into the lower threaded hole in Coupling 19. A Bolt passed through one of the Semi-Circular Plates is screwed into the upper threaded hole in the Coupling.

The steering column is an 8" Rod mounted in two Fishplates bolted to the lugs of two $1\frac{1}{2}$" x $\frac{1}{2}$" Double Angle Strips. Those Double Angle Strips are attached to the chassis by a 1" x $\frac{1}{2}$" Angle Bracket and a Fishplate. A Worm on the steering column between the two Fishplates engages a 7/16" Pinion on a $1\frac{1}{2}$" Rod mounted in the centre holes of the Double Angle Strips. This Rod carries a Crank 24 extended by a 2" Strip. A Collar 25 is screwed on to a bolt held in the Strip by a nut, and a $1\frac{1}{2}$" Rod in the Collar carries an End Bearing that is lock-nutted to an arm of the Bell Crank 23.

Construction of the Engine Unit and the Clutch.

Each side of the engine unit is a $3\frac{1}{2}$" x $2\frac{1}{2}$" Flanged Plate and the ends are 3" x $1\frac{1}{2}$" Flat Plates. On each side a $3\frac{1}{2}$" Strip is attached to Angle Brackets fixed to the lower corners of the Flat Plates. A Bush Wheel is bolted to the front of the unit and a Wheel Disc to the rear. Two $2\frac{1}{2}$" x $2\frac{1}{2}$" and two $2\frac{1}{2}$" x $1\frac{1}{2}$" Flexible Plates form the top of the engine and they are curved to the same radius as the Bush Wheel and the Wheel Disc. The general arrangement of the exhaust manifold can be seen in Fig. 1. The

curved sections of the exhaust pipe are formed by Flexible Coupling Units. The induction manifold consists of a large Fork Piece bolted to the centre of a Double Bent Strip, which is fixed to the side of the engine. A horizontal 2" Rod passed through the Double Bent Strip carries two Couplings, and a vertical 1½" Rod in the large Fork Piece is fitted with two Couplings. The upper one of these is bolted to a Chimney Adaptor fitted in a Sleeve Piece, which is fixed to the top of the engine.

The fan is formed by a 2½" Strip attached to a Rod Socket, which is fixed on a 4½" Rod that carries a ½" fixed Pulley 26. The dynamo consists of two Chimney Adaptors bolted to the side of the engine. A 1½" Rod is held in them by a Collar and a ½" fixed Pulley, and a 6" Driving Band is passed round this Pulley, the Pulley 26 and round a 1" Pulley 27. Pulley 27 is fixed on a 5" Rod that carries a 1" Sprocket 28 and a 2" Sprocket 29. The starter motor is made in the same way as the dynamo but the ½" Pulley of the dynamo is replaced by a ¾" Sprocket.

The clutch housing is made by bolting two Semi-Circular Plates to the rear end of the engine. A 2½" x 1" Double Angle Strip and two 1" x 1" Angle Brackets are fixed to the Semi-Circular Plates. Four 2½" Strips 30 are bolted to the Angle Brackets and to the lugs of the Double Angle Strip, and the other ends of these Strips are attached to the lugs of two 1½" x ½" Double Angle Strips fixed across three Wheel Discs 31 bolted face to face. The clutch output shaft is a 3½" Rod 32. It carries a 1½" Pulley fitted with a Tyre, a Socket Coupling, a Compression Spring, a Collar 33 and another Collar that prevents the Rod from sliding in the housing. The 1½" Pulley is gripped in one end of the Socket Coupling and the assembly is loose on the Rod. The Compression Spring is placed between the Socket Coupling and the Collar 33, which is fitted with a 7/32" Bolt that engages the slot in the Socket Coupling. The Compression Spring normally forces the Tyre against the Sprocket 29.

The clutch release pedal is a Rod and Strip Connector on a 1" Rod held in a Short Coupling. The Short Coupling is fixed on a 3½" Rod 34 mounted in 1" Corner Brackets bolted to two of the Strips 30. The Rod is held in place by a Collar, and two Couplings on the Rod carry ½" Bolts that engage in the groove in the Socket Coupling.

The engine unit is supported by two 1" x ½" Angle Brackets bolted to the 1½" Angle Girders that carry the Corner Brackets 15 and 16.

Assembly of the Gear-Box

The sides of the gear-box are made from 3½" and 1½" Strips, and they are connected at the front end by three 1½" x ½" Double Angle Strips and at the rear by two 1½" x ½" Double Angle Strips. A ½" Pinion 35 is mounted loosely on a ¾" Bolt fixed in the centre Double Angle Strip at the front by two nuts. The gear-box frame is bolted to the Wheel Discs 31. A 1½" x ½" Double Angle Strip is fixed inside the frame and is spaced from the sides by a Washer on each bolt. This Double Angle Strip supports the end of Rod 32, which carries a ½" Pinion 36 and a 1" Gear 37. The gear-box output shaft is a 2½" Rod fitted with a 1" Gear 38, a 50-tooth Gear 39 and a 57-tooth Gear 40. Rod 32 projects part way into the boss of Gear 40. The layshaft is a 4½" Rod that carries the Gears and Pinions seen in Fig. 4. The gear-box can be arranged to provide three forward speeds and reverse, but in the model the layshaft is prevented from sliding by a Collar and the 1" Gears on it are set to mesh with the 1" Gears 37 and 38. The Pinions on the layshaft are set in neutral positions.

The gear change lever is a 2" Rod in a Coupling locked on a 1⅛" Bolt that is fixed by nuts in two 2" Slotted Strips 41. Each of these strips is attached to one side of the gear-box by a ⅜" Bolt. The gear-box output shaft is connected to the rear axle driving shaft by a 4" Rod and two Universal Couplings. The gear-box is connected to the chassis by two 2" Angle Girders and two 1" Triangular Plates.

The Brakes and the Radiator

Each brake shoe consists of a bolt in a 1" Triangular Plate fixed by a nut on a $\frac{1}{2}$" Bolt. The $\frac{1}{2}$" Bolt is passed through a Face Plate of the rear axle or a Semi Circular Plate of the front axle, using Washers for spacing purposes, and a Fishplate is locked on it by two nuts. A short length of Spring Cord is used as a return spring for the brake shoe.

The brakes are operated by flexible wire passed through lengths of Spring Cord. One end of each length of Spring Cord is clamped by a bolt in a Collar, which is screwed on to a bolt passed through the Face Plate or the Semi-Circular Plate carrying the brake shoe. The other end of the Spring Cord is similarly held in a Collar screwed on to a bolt fixed in the chassis. One end of each length of wire is fastened to the Fishplate of each brake, and the other end is connected to an arm of one of two Double Arm Cranks 42. The Double Arm Cranks are fixed on a 5" Rod mounted in the girders 10. The brake pedal 43 is formed by a Rod and Strip Connector on a $1\frac{1}{2}$" Rod, which is held in another Rod and Strip Connector bolted to one of the Double Arm Cranks 42.

The radiator is formed by three $2\frac{1}{2}$" Angle Girders, two $2\frac{1}{2}$" Strips and two $1\frac{1}{2}$" Strips arranged as shown in Fig. 1. The water tubes are represented by Tension Springs passed over 2" Screwed Rods supported in Angle Brackets.

The Base and Driving Mechanism.

The base is assembled from $24\frac{1}{2}$" and $9\frac{1}{2}$" Angle Girders arranged as shown in Fig. 1 and filled in by eight $12\frac{1}{2}$" x $2\frac{1}{2}$" Strip Plates. An E20R(S) Electric Motor is bolted to two of the $9\frac{1}{2}$" Angle Girders, and a 7/16" Pinion on its armature shaft engages a 60-tooth Gear on a Rod mounted in the side-plates. A 7/16" Pinion on the same Rod as the Gear drives another 60-tooth Gear on a Rod supported in the upper corner holes of the side-plates. This Rod carries a $\frac{3}{4}$" Sprocket, and when the chassis is in position on the base the Sprocket is connected by Chain to the Sprocket 28 of the engine unit.

The rear end of the chassis is supported by two $4\frac{1}{2}$" Angle Girders bolted between the base and the girder 7. The front end is supported by two 3" Angle Girders bolted to the base and connected at their upper ends by a Flat Trunnion, which is bolted to one of the Strips attached to the Corner Braskets 15.

PARTS REQUIRED

8 of No.	1b	8 of No.	18a	1 of No.	58	2 of No.	136a
2 " "	2	3 " "	18b	30 " "	59	4 " "	137
8 " "	2a	4 " "	19b	2 " "	62	2 " "	140
11 " "	3	2 " "	19s	2 " "	62b	4 " "	142b
8 " "	4	1 " "	20a	12 " "	63	1 " "	142d
15 " "	5	1 " "	21	2 " "	73	2 " "	147b
6 " "	6	1 " "	22	3 " "	77	1 " "	154a
18 " "	6a	2 " "	23a	2 " "	81	1 " "	154b
4 " "	7	5 " "	24a	2 " "	82	2 " "	162a
2 " "	7a	3 " "	25	4 " "	89b	2 " "	163
9 " "	8a	5 " "	26	10 " "	90	8 " "	164
10 " "	8b	3 " "	26	2 " "	94	6 " "	165
4 " "	9	1 " "	27	1 " "	95	1 " "	166
7 " "	9a	1 " "	27	1 " "	96	1 " "	171
4 " "	9b	2 " "	27	1 " "	96a	2 " "	175
2 " "	9c	1 " "	28	2 " "	103b	1 " "	179
3 " "	9d	2 " "	29	1 " "	103f	1 " "	186a
2 " "	9e	4 " "	31	2 " "	103k	4 " "	187a
4 " "	9f	1 " "	32	2 " "	109	3 " "	188
10 " "	10	425 " "	37a	4 " "	111	1 " "	189
6 " "	11	357 " "	37b	10 " "	111a	4 " "	190
23 " "	12	148 " "	38	20 " "	111c	2 " "	192
1 " "	12b	4 " "	38d	11 " "	111d	8 " "	197
1 " "	13	6 " "	43	1 " "	116	8 " "	212
1 " "	13a	2 " "	45	2 " "	116a	4 " "	213
2 " "	14	2 " "	46	2 " "	120b	14 " "	214
2 " "	15	10 " "	48	2 " "	125	1 E20R(S)	Electric Motor.
4 " "	15a	4 " "	48a	1 " "	126a		
1 " "	16	4 " "	48b	1 " "	128		
3 " "	16a	2 " "	53	16 " "	133a		
3 " "	16b	2 " "	55a	4 " "	136		
3 " "	17						